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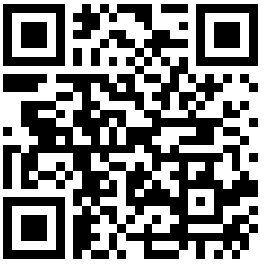

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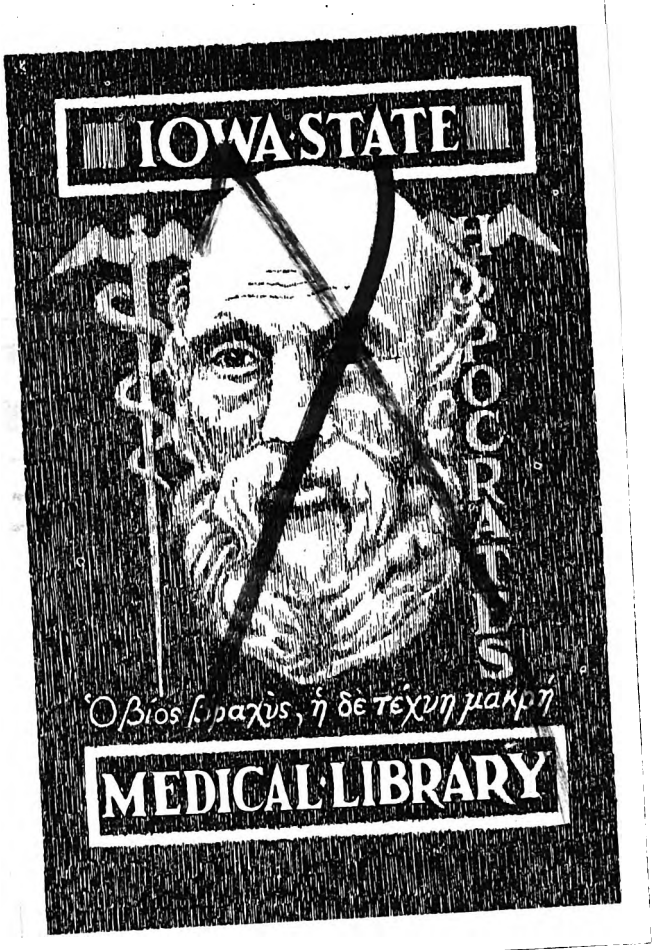

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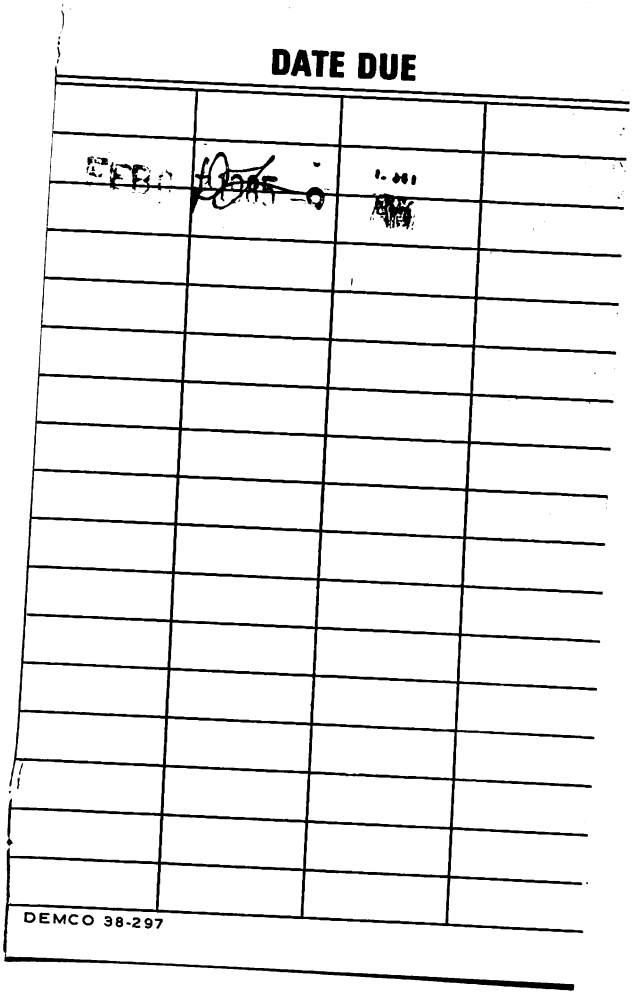

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MEDICINE AND THE COMMUNITY

THE TASK OF STATESMANSHIP

A SPEECH TO THE BRITISH MEDICAL ASSOCIATION

LORD DAWSON OF PENN, FRCP
PRESIDENT OF THE ASSOCIATION

MEDICINE does not stand alone, it stands in relation to the whole social organism. An upheaval at once so vast and universal as this war must change the texture of civilisation, and the changes will for the most part be those already in seed or in bud, waiting for some impetus to bring them to fruition. Land tenure, planning for town and country homes, industry, social security, health and education afford examples and there seems to be a common line of thought running through these projects—that the community must, in varying degrees, form a partnership with individual effort so as to give direction and equality of opportunity without blunting the enterprise and zest of individual man to think and strive for the benefit of himself and his kind and thus preserve to personality freedom and scope. If in that partnership the scales are weighted too much in favour of community direction, the result will be regimentation and a deadening uniformity, and if weighted too much in favour of individualism the result will be haphazard and uncoördinated service; thus the task of statesmanship is to find the mean.

The progressive quickening of the social conscience, an outstanding feature of this century, has found expression in the humanising of industry and in a body of social efforts without precedent and a body of legislation to improve the health and welfare of the people. But if we pause to inquire whether the achievements of social reform between the last war and this, as judged by the removal of social inequalities and the establishment of social justice, were effective, our answer would have to be No. I need but instance housing, social security, medical services and education; there has been and there still is a sense of frustration in the community.

To focus on our own special concern, is it not a reproach, in view of the way medical knowledge has marched ahead, that a corresponding comprehensive health and medical service has not been made available to all citizens long ere this? In this connexion the pioneer efforts of the medical profession stand forth to its credit, and I am going to stress that historical truth. From 1920 onward it has, through various agencies, successively and consistently advocated a comprehensive medical service and coöperation between local authorities and voluntary hospitals and agencies, and the latest of these efforts is the Medical Planning Commission—a widely representative body. In contrast, the Ministry of Health from the death of Sir Robert Morant in 1920 to nearly the outbreak of this war, has cold-shouldered or opposed any such suggestions. It is only fair, however, to add that those many years of obscurantism have given place at the Ministry for two or three years past to enlightened coöperation, and, let me say further, that the present Minister, who is greatly interested in this reconstruction, has repeatedly stated that this comprehensive service should be a partnership between the local authorities and voluntary hospitals and that in the administration of such a service doctors would play an important part.

Since the Interim Report of the Planning Commission saw the light of day the Beveridge report on Social Insurance has come into the picture. Most of us would say that greater security against want is socially just, but the social-security scheme postulates Assumption B, which is concerned with a nation-wide comprehensive service; the inference is that the foundation of such a service is an accepted policy, and incidentally it has wide and strong popular support.

* * *

In recent weeks there has been public misunderstanding because discussion about the form of the service has been interpreted as opposition to its foundation, and this has led to a considerable amount of criticism of the profession which shows at present little sign of abatement. An illustration has arisen from the motion passed at yesterday's meeting, when by a large majority "a whole-time, salaried state medical service" was rejected. No less than 3 intelligent people said to me last evening that they were surprised to see that the Representative Body had, after all, voted against a "state medical service," which is quite a different proposition, for it is impossible to carry out Assumption B without the state having a general direction.

Needless to add, in the shaping and organisation of the service doctors must have a big say; after all, they have to work it, they know the complexities of medical practice, and they, with the public good in the forefront of their minds and subject to the authority of Parliament, must carry a leading responsibility. Be it remembered that the changes in medical practice to be wrought are deep and fundamental and will affect all members of the profession, and no other nation, comparably placed, has undertaken so big an endeavour. Is it not obvious, therefore, that this service must be built up in stages, in accord with the Prime Minister's Five Year Plan, foundations first? I will now consider one of these foundations.

Any service needs administrative direction. The British Medical Association is an example. If properly designed that direction will not interfere with our freedom and the Minister has promised that the profession shall have a large share in such administration. What, then, is the best form of local administrative body for this service, for that, after all, is the prerequisite to any action of any kind, and has to be settled first. Should that local administrative body be the major local authorities; or a joint board enbracing several major local authorities with vocational advisory bodies attached (and that last is an essential condition); or should there be large areas specially delineated for health purposes, each administered by a widely representative Health Council?

The last idea is, to my mind, the most far-sighted and attractive proposition; both for the public and the doctors it offers the best prospect of future development. I hope the Government will give it favourable consideration, but we must remember this, that the Minister of Health is between the upper and nether stone. On the one hand he has to pay attention to the medical profession and wishes to do so; on the other he has to carry along with him the local authorities. Local authorities might not be too eager to agree to the larger plans which I personally would favour—health provinces administered by a representative health council.

* * *

In the light of Assumption B, the Beveridge report leaves to the medical profession and the community the devisal of the comprehensive service. The social-security payment for sickness is only a maintenance payment, and the Beveridge report favours voluntary insurance to be "jam" for the "bread." Here contributory schemes would provide amenities according to the taste of the patient. Supposing a grocer who by his industry has become a successful man wants to provide his sick wife with the comforts of a room in a pay block, is he to be denied that privilege? The service of medicine needs to be infinitely flexible. Man sick is individualistic, and let us beware of the doctrinaires who think in terms of tyrannical uniformity, one of the faults of the Nazi creed. We want the same essential service for all—namely, the best, but no dull uniformity with it. A comprehensive service free to all citizens does not necessarily involve a whole-time salaried service for all doctors, nor is it incompatible necessarily—I am not saying desirably—with private practice and pay blocks. Though, in my belief, more earnings in the future will be derived from salary and less from fees, I am far from convinced that any uniform system of service or payment will meet conditions so multifarious as those attaching to medical practice, and any emergence of official and non-official groups of doctors would, in my opinion, be disastrous.

We must recall that one of the evil consequences of the Ministry of Health not accepting the advice of the leaders of the profession in 1929 was that they thereby instituted in any one town, two sets of hospitals and two groups of doctors. If they had then accepted advice and instituted machinery for progressive coördination of local government and voluntary services we should be much nearer our goal today than we are. Fortunately we now have at the Ministry a different order, anxious to work with the profession.

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Payment by salary, by fee, by capitation grant, separately or in combination, these admittedly thorny questions can only find their solution in the light of experience. Any satisfactory scheme for a comprehensive medical service can only be built up in stages—foundations first and soon, superstructure later and gradually in the light of accrued experience. Such experience could be obtained by different "try-outs" in different regions during an experimental period, and that applies, for instance, to health centres. Customs, habits and feelings, many of them centuries old, must not be suddenly uprooted, rather must the new order be gradually grafted on to medicine's historic past. Such is our English way. So following it, not otherwise, when its re-orientation reaches completion medicine will have become greater in its comprehension and will offer to its disciples a life of fullness and content, and to the people a steadily enlarging prospect of health and welfare.

PATHOLOGY OF ACUTE HEPATITIS

ASPIRATION BIOPSY STUDIES OF EPIDEMIC, ARSENOTHERAPY AND SERUM JAUNDICE

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THE problem of jaundice in war-time is of such magnitude that we decided to amplify and extend the biopsy studies of its pathology started in Denmark by Iversen and Roholm (1939). Our main morbid histological findings are presented in this paper with some preliminary clinical associations. More detailed analyses of the technique and its applicability, and of biochemical correlations, will be published later.

TECHNIQUE AND RISKS

The technique is essentially that of Iversen and Roholm (1939). A small cylinder of liver tissue is aspirated into a 2 mm. bore cannula passed transpleurally through an anæsthetised track into the right lobe of the liver. The tissue is fixed in absolute alcohol, sectioned and stained histologically by standard methods, including glycogen staining by Best's technique.

Though liver puncture for diagnostic and research purposes has long been used in the tropics, it has not gained any popularity in western countries on account of its undoubted risks. Yet it is probably safer than spleen puncture and of much greater value. A survey of 613 published cases with 6 deaths (Bingel 1923, Olivet 1926, Huard, May and Joyeux 1935, Baron 1939, Iversen and Roholm 1939, Tripoli and Fader 1941) shows a mortality of about 1%, mainly in severe anæmias (2 cases with hæmoglobin under 15%), and in severe obstructive jaundice. We felt, however, that this risk could be considerably reduced by a careful selection of cases, precautionary measures such as are usual when operating on a jaundiced patient, and a close watch for, and prompt transfusion in, hæmorrhage. Moreover Iversen and Roholm had claimed 160 punctures with no fatalities. No immediate bleeding was recognised in any of our cases, but 3 out of 126 punctures were followed by signs of hæmorrhage within 24 hours. Two were promptly transfused and gave no further anxiety. In the third, a severe case, the patient died and at autopsy acute liver necrosis was found. A fourth case, already moribund from subacute liver necrosis with ascites, general paralysis of the insane and rectal carcinoma, developed signs of hæmorrhage 48 hours after the puncture and considerable blood-staining of the ascitic fluid was present at autopsy. The risks are thus maximal in the most severe cases.

The technique, therefore, cannot be recommended as a routine procedure. Applied with full knowledge of the risks, and under conditions permitting a close watch on the patients, it yields results of considerable value, justifying its application to the research study of obscure cases of jaundice. No deaths have occurred in non-jaundiced cases in which there may be an even wider field of application.

* Working on behalf of the Medical Research Council.

MATERIAL

Adult cases of epidemic hepatitis admitted to this hospital during the year 1941–42 have been studied. The Army authorities coöperated in the investigation by putting at our disposal cases of jaundice developing during arsenotherapy for syphilis. The American Red Cross Harvard Unit also invited us to apply the method in cases of hepatitis following the inoculation of mumps convalescent serum. To this group we add 2 cases of jaundice which followed serum transfusions in this hospital (for burns and hypoproteinæmic œdema). The cases can be tabulated as follows:

	Cases		*Biopsies*	
Epidemic hepatitis	14		18	
Arsenotherapy jaundice ..	35	56	35	61
Serum jaundice	7		8	

Although there may be different ætiological factors in each of the above groups, we have not found any recognisable histological criteria for their differentiation. A hepatic inflammation of varying intensity and distribution is common to them all, and therefore for purposes of pathological description we may disregard this ætiological grouping and consider the findings as a whole.

PATHOLOGY

The changes in the liver are related to the severity and duration of the disease. For purposes of comparison we have dated the condition from the onset of jaundice, although there is always a variable period of diverse prodromal symptoms.

Broadly speaking, the picture is one of hepatic cell necrosis and autolysis, associated with leucocytic and histiocytic reaction and infiltration. The centres of the lobules show the first of these changes most markedly, and the portal tracts the greatest cellular infiltration. In certain cases, which seem to be either those which are mild from the beginning or in which the lesion is retrogressing, the periportal cell accumulations predominate in the picture (fig. 6), in contradistinction to the more severe cases in which hepatic cell degeneration is more pronounced and the histiocytic and leucocytic infiltration more widespread (figs. 1 and 4). For descriptive purposes we call the first of these the "zonal" and the second the "diffuse" type of change, but it must be understood that there are no good reasons for regarding these differences as fundamental, and that an intermediate picture occurs which we have denominated a "mixed" lesion (fig. 5). Finally, there are those cases in which the lesion is well on in the phase of retrogression, or is progressing to a stage of necrosis, nodular hyperplasia or cirrhosis.

FREQUENCY WITH WHICH THE DIFFERENT PATHOLOGICAL LESIONS WERE FOUND IN RELATION TO DURATION OF DISEASE AND INTENSITY OF THE JAUNDICE

Type of lesion	Duration in weeks			Serum bilirubin (mg. per 100 c.cm.)
	Under 1	1–2	Over 2	
Diffuse	12	2	1	3–17·2 (mean 8·0)
Mixed diffuse and zonal	7	4	3	2·6–14·6 (mean 8·0)
Zonal	9	3	9	Under 1 wk., 2·5–6·3 (mean 4·7) Over 2 wks. 1·1–9·2 (mean 3·3)
Residual fibrosis ..	..	..	6*	..

* Duration 7–26 weeks; only 2 slightly jaundiced.

In the table it will be noted that diffuse lesions are seldom encountered after the second week, and that zonal inflammation tends to fall into two groups, one of short and the other of long duration. These correspond respectively to early and mild lesions, and late residual lesions in cases which at an earlier stage presumably showed more extensive hepatic change.

HISTOLOGICAL EXAMPLES

We may illustrate the different degrees of intensity of the liver damage by reference to typical cases.

1. *Severe, acute hepatitis, with a diffuse lesion affecting the whole liver lobule.*

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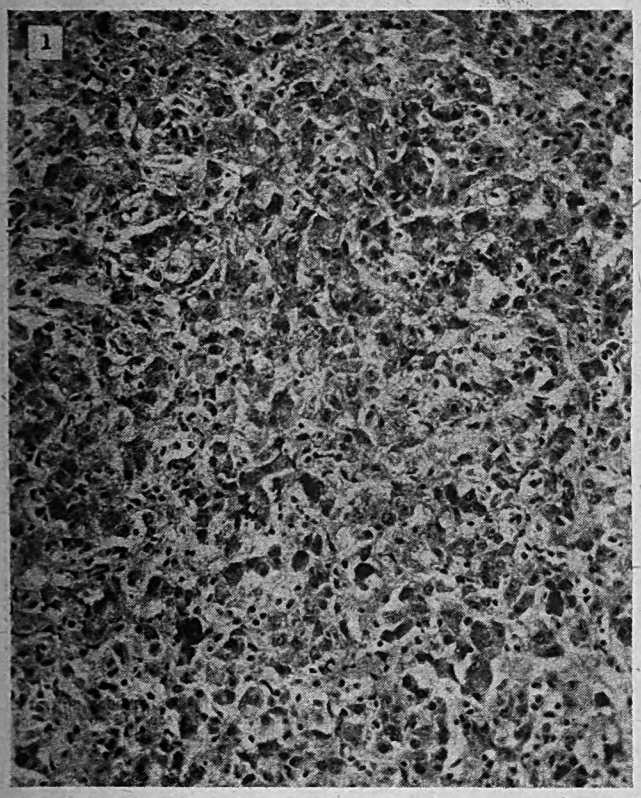

Fig. 1—Case 1. Epidemic hepatitis. Diffuse acute hepatitis showing loss of lobular pattern, irregularity in cell staining with loss of glycogen, and the presence of inflammatory cells. Best's carmine stain. (x 160.)

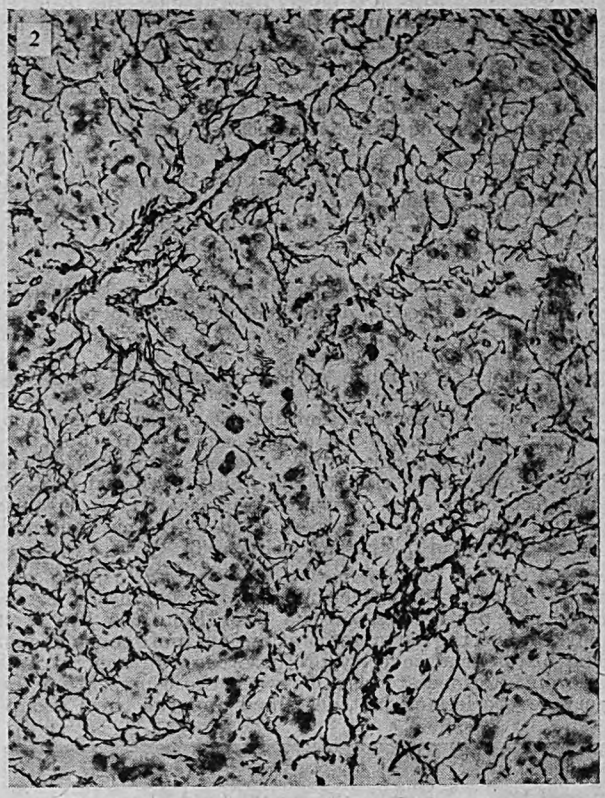

Fig. 2—Case 1. Foot's reticulin stain showing general preservation of reticulin pattern in spite of the severe cellular lesion. (x 160.)

CASE 1.—A man, aged 29, suffering from epidemic hepatitis. Jaundiced 19 days. Liver enlarged 1 in. below umbilicus, serum bilirubin 11·9 mg. per 100 c.cm. Nausea and vomiting persisted one week after biopsy (figs. 1 and 2). Three weeks later the serum bilirubin had fallen to 1·6 mg. and five weeks later to 0·6 mg. per 100 c.cm. At this stage the liver was not enlarged and a further biopsy was taken (fig. 3). The section at the acute stage shows an acute diffuse inflammation.

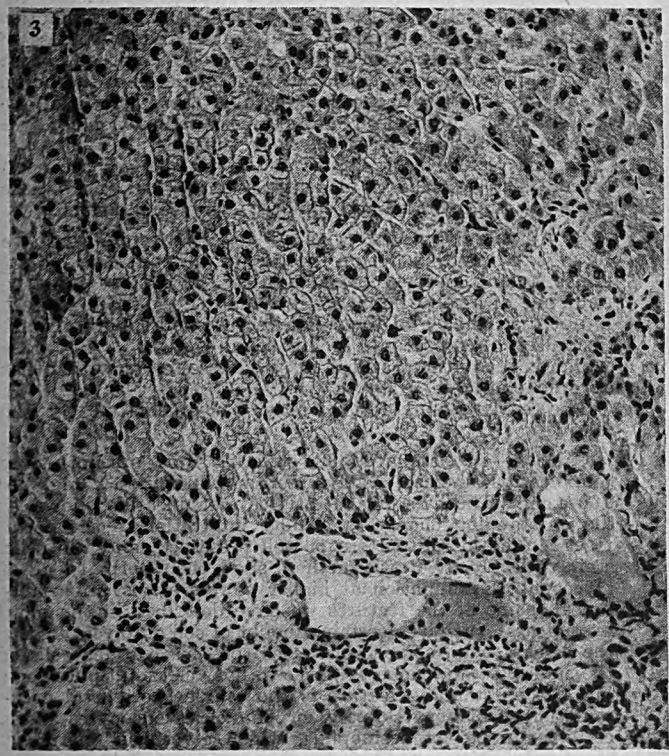

Fig. 3—Case 1. One month later. Recovery with restitution of the lobular pattern and disappearance of the inflammatory cells. Some increased cellularity remains in the portal tracts. H. & E. (x 160.)

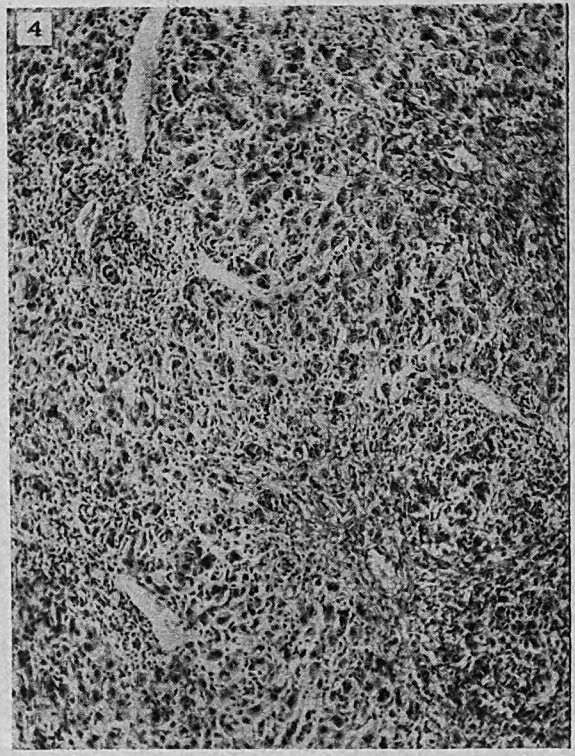

Fig. 4—Case 2. Arsenotherapy jaundice. Diffuse form of acute hepatitis with destruction of liver architecture, extreme cell necrosis and infiltration with inflammatory cells. H. & E. (x 75.)

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(1) The lobular pattern is barely recognisable; the liver cell columns are broken up; the degenerated liver cells are replaced by a tissue made up of collapsed sinusoids, with their reticular framework, and endothelial cells. (2) Many of the surviving liver cells show various changes of necrosis and autolysis, with pyknotic nuclei and evidence of cell proliferation in the shape of numerous binucleate liver cells.

This type of picture has been encountered in 15 cases; it is one from which complete recovery may, and in most cases does, occur. The process of recovery illustrated (figs. 1, 2, 3) is discussed in a later section.

An even more severe diffuse lesion is illustrated in fig. 4.

CASE 2.—A male, aged 22, suffering from arsenotherapy jaundice. Jaundiced 5 days, liver enlarged to umbilicus, serum bilirubin 14·2 mg. per 100 c.cm. In addition to the diffuse inflammation (similar to that of fig. 1) the portal tracts show much infiltration with leucocytes and histiocytes.

This unusually severe lesion did not recover in the usual manner. The jaundice ran a long course. Free fluid was detected in the abdomen 3 weeks later. Finally, both the jaundice and ascites cleared, and from the clinical point of view recovery seemed ultimately satisfactory. It is quite possible that nodular hyperplasia and a true cirrhosis may have developed in this patient (compare fig. 9).

2. *Moderate acute hepatitis with mixed diffuse and zonal lesions.*—This picture was found in 14 cases. Here the destruction of the liver lobule is less well marked, and the portal infiltrations are more conspicuous. The histological severity of these cases in general falls into an intermediate class between those presenting the very severe lesions just described and the third group,

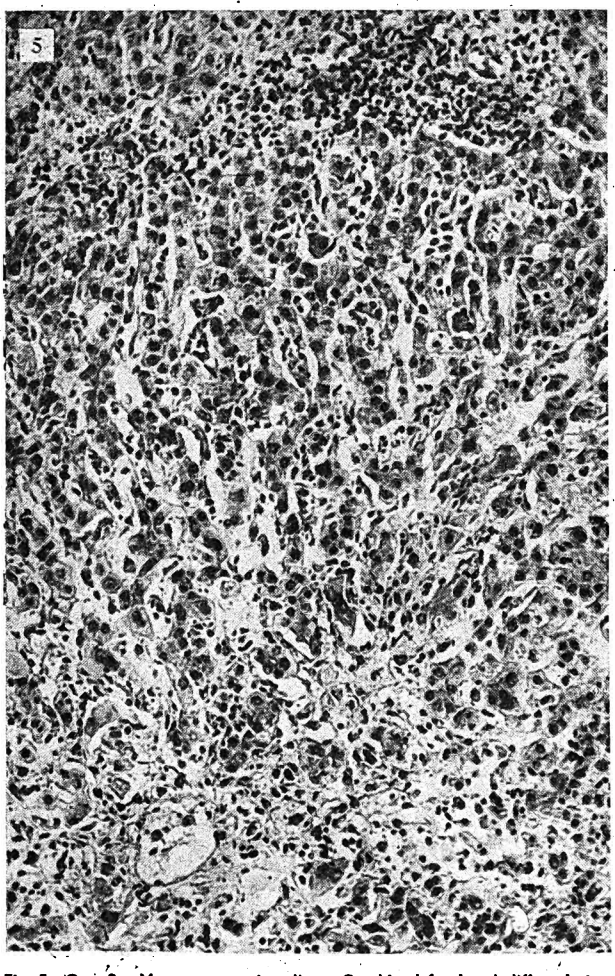

Fig. 5—Case 3. Mumps serum jaundice. Combined focal and diffuse lesion. A central vein is seen below surrounded by an area of cell autolysis. A portal tract above shows leucocytic infiltration. The liver cell columns are partially disrupted and there is extensive sinusoidal cell proliferation and leucocytic infiltration. H. & E. (x 150.)

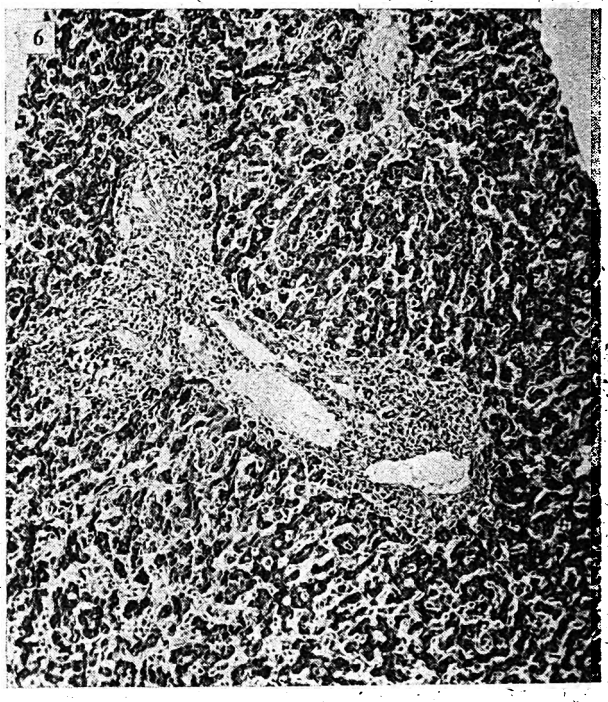

Fig. 6—Case 4. Arsenotherapy jaundice. There is marked cellular infiltration in the portal tracts, the lobule pattern is well preserved and the cells stained darkly by Best's method show their normal load of glycogen. (x 80.)

in which the most obvious changes are in the portal zones.

CASE 3.—A man, aged 19. Jaundice had followed 10 weeks after the injection of convalescent mumps serum. At the time of biopsy the patient had been icteric for 3 weeks. The serum bilirubin was 14·6 mg. per 100 c.cm. The liver section is shown in fig. 5, which includes a central vein and a portal tract. The points which appear are: (1) considerable loss of regularity of liver cell columns and disturbance of the normal architecture of the hepatic lobule; (2) a rarefaction of the cells about the centre of the lobule and some loss of staining—the effects of cellular necrosis and autolysis; (3) an infiltration with small inflammatory cells in the portal zone; and (4) increased cellularity over the whole field, due to leucocytic infiltration and some proliferation of the reticulo-endothelial cells of the liver sinusoids.

In this picture both diffuse and zonal changes are combined. The lesion is of moderate severity, but the patient made an uninterrupted and clinically complete recovery.

3. "*Zonal*" *limited type of hepatic lesion.*—As we have explained, a lesion predominantly in the portal zones occurs in two circumstances. First, it may be evidence of a mild hepatitis in which the lobular pattern is not disturbed and liver cell necrosis is at a minimum. Secondly, it represents a late condition in a hepatitis which is recovering, and it may be associated with other chronic changes.

The early zonal lesion may be illustrated by the following:

CASE 4.—A man, aged 32, suffering from arsenotherapy jaundice. Jaundiced 3 days, serum bilirubin 6·1 mg. per 100 c.cm. The liver (fig. 6) at this magnification shows, as the outstanding change, a cellular infiltration in the portal tracts. The lobule pattern is well preserved, and the cells, stained darkly by Best's method, show their normal load of glycogen. Examination at higher powers almost invariably reveals some of the features we have described in the more severe cases, such as a certain amount of cell autolysis around the central vein, some proliferation of the Küpffer cells of the sinusoids, and some evidence of liver cell multiplication: but the outstanding feature is the cellular periportal accumulation of histiocytes, polymorphonuclear leucocytes and a certain number of eosinophils, which gives this picture a peculiarity of its own.

The retrogressive hepatic zonal lesion is illustrated in figs. 7 and 8.

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CASE 5. A man, aged 32, suffering from epidemic hepatitis. Jaundice had started 4 weeks before admission. This cleared up in 9 days, only to recur 7 days before he entered hospital. At this time, when the first biopsy was taken (fig. 7), the bilirubin was 6·4 mg. per 100 c.cm. The jaundice subsided very slowly during the next 6 weeks. The last biopsy (fig. 8) was performed 8 weeks after the first, and 12 weeks after the initial attack of jaundice. The serum bilirubin was now 0·6 mg. per 100 c.cm. At this stage clinical recovery appeared complete.

The first biopsy (fig. 7) shows a wide zone of periportal cellular connective tissue with numerous new bile-ducts. The lobule also shows some diffuse inflammatory change becoming more intense towards the centre. The last biopsy (fig. 8) shows a somewhat narrower periportal fibrotic zone with less numerous bile-ducts. The lobular inflammation has subsided.

4. *Chronic residual and fibrotic lesions.*—It is difficult to separate these clearly from the group of late zonal lesions just described. The last biopsy in case 5 illustrates clearly the periportal fibrotic scarring which may persist after clinical cure is apparent. Judging from the extreme rarity of true perilobular cirrhosis in routine autopsies, it seems likely that this type of residual scarring may ultimately disappear altogether. The question of progressive fibrosis will be discussed later.

HISTOLOGICAL DETAIL

It is not proposed in the present paper to go into the histological minutiæ, but for the sake of completeness we may summarise the main features of the changes found:

(*a*) *Hepatic lobules.*—In the severer cases, including all the lesions described as diffuse, there has been severe disorganisation of the architecture of the hepatic lobules. The columns of liver cells are broken up; the individual cells are separated and show decisive evidence of necrosis and autolysis. Many of the cells are swollen, often with large nuclei or with more than one nucleus, while others, in becoming necrotic, are changed into intensely eosinophilic masses, usually devoid of a nucleus. The cytological changes in the mixed and zonal forms are less striking, and in the latter are limited mainly to a swelling and autolysis of cells round about the central vein, and some apparent loss of cells in the region occupied by the infiltration round the portal tracts. In most cases dual and occasional multiple nuclei are common in the liver cells. Mitoses are seen but are less common than might be expected. Inclusion bodies have not been found in the hepatic cells.

(*b*) *Central zones.*—The areas about the central veins usually show well-marked rarefaction due to the disappearance of liver cells. The remaining cells often look bloated, with rarefaction of the cytoplasm and swollen nuclei. The wall of the central vein may undergo hyaline thickening and the entering sinusoids are dilated and much more readily seen than normally.

(*c*) *Portal zones.*—There is a marked tendency for accumulation of cells in these areas. Less noticeable in the severe acute lesion, they are of especial prominence in the milder early acute lesions. The cells are mostly small mononuclear cells of the histiocytic class, but a variable number of polymorphs is present and eosinophils may also be

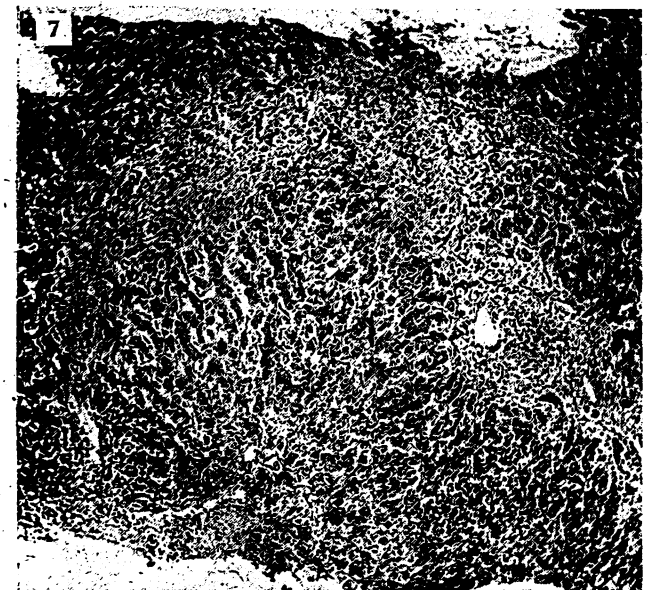

Fig. 7—Case 5. Epidemic hepatitis. There is a wide zone of periportal cellular connective tissue with numerous new bile-ducts. The lobule shows diffuse inflammatory change becoming more intense towards the centre. H. & E. (× 60.)

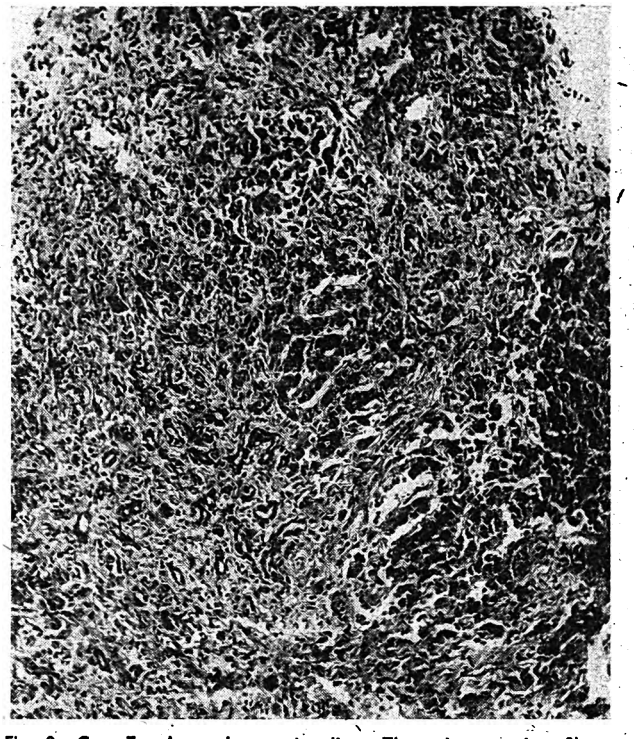

Fig. 9.—Case 7. Arsenotherapy jaundice. There is extensive fibrous change with the liver cells, many of which are degenerate, split up into islets. H. & E. (× 90.)

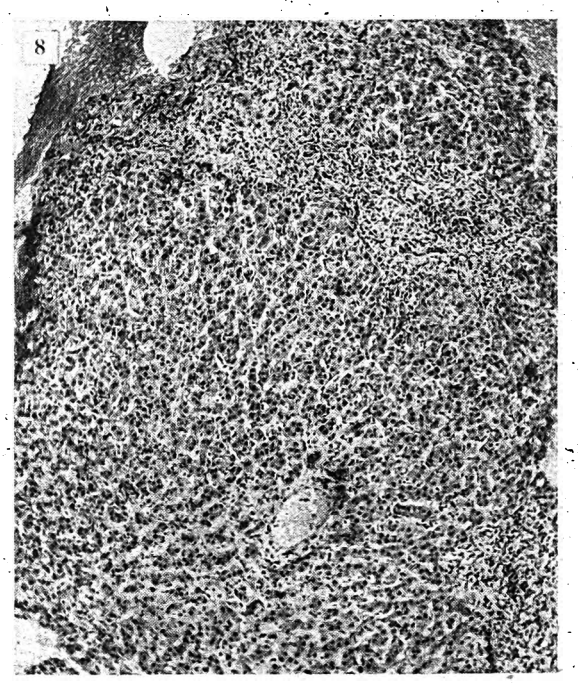

Fig. 8—Case 5 (eight weeks later). There is an apparent shrinkage in the periportal inflammatory zone with less numerous bile-ducts. The lobular inflammation has subsided. H. & E. (× 60.)

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seen. The infiltrations tend to spread from portal tract to portal tract round the periphery of the lobules, and may send prolongations into the lobules in certain cases. The question arises whether these are simple infiltrations which push aside the tissues, or whether to some extent they replace necrotic liver cells. There is little exact evidence on this point, but since in some of the earliest cases these sites show a condensation of reticulin, suggesting some collapse of this portion of the lobule, it seems probable that liver cells have disappeared from these areas. Sometimes recognisable liver cells are seen trapped among the periportal cellular tissue. In the cases of long standing the portal infiltrations show fibroblasts and new formation of young fibrous tissue.

(*d*) *Sinusoids.*—There is a general enlargement and hyperplasia of the sinusoidal "endothelial" cells, giving the liver lobule an abnormally cellular appearance. Here and there these cells form small focal accumulations. It is possible that these are associated with focal necroses. Polymorph leucocytes and eosinophils may also be seen in the lumina of the sinusoids.

(*e*) *Glycogen.*—The glycogen content of the surviving liver cells is usually well preserved. It disappears with cellular autolysis. Odd cells, especially in the severer cases, appear abnormally heavily loaded with glycogen, apparently a necrobiotic phenomenon.

(*f*) *Fat.*—Although special fat stains could not be used for the alcohol-fixed material, there was in most cases a notable absence of any appearances in the cells which would suggest the presence of fatty change. In this respect the biopsy material differs from what is commonly found at autopsy.

(*g*) *Reticulin.*—The reticular framework of the lobules is often quite unexpectedly well preserved. When there is much hepatic cell loss—for example, in the collapsed central areas of badly damaged liver lobules—there is a condensation of reticulin, and the same appearance is seen in the infiltrated portal zones. In the residual fibrotic lesions of the portal zones an increase in reticulin is seen which is followed by an increase in collagen.

(*h*) *Bile-ducts.*—In rather over a third of the cases proliferation of bile-ducts was observable in the portal tracts. This occurrence could not be related to the duration or severity of the disease. Rather surprisingly it was less often seen in the more purely zonal type than in the more severe types. (Note their retrogression in fig. 8 compared with fig. 7.) In one fatal case in which the biopsy was made on the fourteenth day of the illness and death took place 3 days later, with the findings usual to subacute necrosis, the sprouting of the bile-ducts was more marked than in any other case in the series (fig. 9). On the other hand, in many of our most severe non-fatal lesions, with durations of from 2 to 19 days, this change is not a prominent feature. In the chronic cases, in which a cirrhosis is developing, bile-duct proliferation is usual, although it may be obscured by the newly formed fibrous tissue.

(*i*) *Pigment.*—Some bile-staining of the central cells of the lobule, many of which are in process of necrosis, is common and was a constant feature. Many Küpffer cells were also bile-stained in the central zone. "Bile thrombi" were often seen and were noted in 22 cases; occasionally they were prominent (fig. 10). The distribution of the thrombi was chiefly in the mid-zones of the lobules; the larger interlobular ducts appear normal.

(*j*) *Iron.*—The Prussian-blue reaction does not show any abnormal quantities of iron in the liver.

(*k*) *Hæmorrhages.*—The alcohol-fixed material is not the best in which to observe small hæmorrhages, but, with this proviso, these have not been found.

HISTOGENESIS AND PROGRESS

It is impossible to give accurate data about the duration of the lesion because we are not able to fix with certainty the time of commencement of the disease. This difficulty is well illustrated by the following case:

CASE 6.—A woman, aged, 24, suffering from epidemic hepatitis. There was a history of a previous attack when aged 9 years. She was admitted with headache and dizziness of 7 days' duration. There was neck-rigidity, suggesting meningeal irritation, but no jaundice. Lumbar puncture gave a normal cerebrospinal fluid. Mild jaundice appeared 4 days after entry when a liver biopsy was performed. The serum bilirubin was then 2·5 mg. per 100 c.cm. Four days later it had fallen to 0·6 mg.

The biopsy specimen showed a well-marked portal zonal lesion: there was some bile-staining of the central cells and bile thrombi were found. Polymorphonuclear leucocytes were seen in the periportal infiltration, but early bile-duct proliferation was found, and the lesion was considered, on pathological grounds, to be of a subacute or early chronic nature. It is impossible that these changes could have developed on the day the icterus was noticed, and it seemed probable that the hepatitis was present for at least the whole period of the patient's illness.

Fig. 10.—Arsenotherapy jaundice. Bile thrombi. Methylene-blue. (×1100.)

The findings in this and other early cases have convinced us that the liver inflammation probably begins with the prodromal symptoms which are so often regarded as gastro-intestinal in origin.

Looking at our cases broadly, it appears that the acute and mild case of up to a week's duration is likely to show a lesion which is in the main limited to the portal zone, with but little destruction of the liver lobule. An acute and severe case is likely to show diffuse or mixed type of lesion with well-marked disorganisation of the lobular architecture, with marked degenerative changes in the hepatic cells and considerable histiocytic and leucocytic infiltration of the whole lobule.

We have insufficient data to enable us to follow with certainty the histological evolution of lesions of different degrees of severity from their earliest stages, but such as we have suggest that degeneration and autolysis are most severe in the early stages in the cells about the hepatic vein, and that the leucocytic and histiocytic reaction may proceed from the portal zones centrally.

With regard to the further evolution of the hepatitis, four possibilities are evident:

1. *Clinical recovery with complete restitution of the liver.*—The process of complete recovery is illustrated in figs. 1, 2 and 3. This very severe diffuse hepatitis passed to complete clinical recovery when a second biopsy showed a liver barely distinguishable from normal. A striking feature at the acute stage was the remarkable preservation of the reticulin framework of the liver lobule even in the midst of extensive disorganisation of the liver cells (fig. 2). It seems probable that this framework of reticulin provides a scaffolding on which the lobule is reconstructed when the liver cells regenerate.

2. *Continuous progress of the lesion leading to death, with, at autopsy, the picture of acute or subacute liver necrosis.*—The possibility of transition to the well-known pathological picture of acute liver necrosis of lesions such as those shown in figs. 1 and 4 needs no emphasis. Subacute necrosis is illustrated in fig. 9, which comes from a biopsy taken from one of our fatal cases.

CASE 7.—A man, aged 63, had been receiving arsenotherapy for neurosyphilis. Severe jaundice had developed 2 weeks

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before the biopsy was taken, and at the time of biopsy gross ascites and cholæmia were present. Gross destruction of the liver with microscopic islets of commencing nodular hyperplasia are seen in the section. At autopsy a typical picture of subacute necrosis was found.

3. *Development of liver cirrhosis.*—When the progress of the disease is more prolonged, and fibrotic changes become predominant, a picture of classical cirrhosis is produced. We have encountered two such cases, one in a patient under arsenotherapy, and the other in what appeared to be epidemic hepatitis in an elderly woman.

CASE 8.—A man, aged 29. Four months previously the patient had suffered from arsenotherapy jaundice with the development of ascites. There had been four abdominal paracenteses. Symptoms subsided in 2 months. On admission he was symptom-free. There was clubbing of the fingers. The liver was firm, with its edge 1 in. below the costal margin. The spleen was just palpable. The serum bilirubin was 0·2 mg. per 100 c.cm. The biopsy specimen showed the liver cells broken up into islets which assumed the circular adenomatous character of cirrhosis or "nodular hyperplasia," with well-formed bands of collagenous fibrous tissue surrounding them and some overgrowth of new bile-ducts. Fig. 11 shows the abnormal reticulin pattern with nodular hyperplasia and condensation of the fibres between the nodules.†

CASE 9.—A woman, aged 71, suffering from epidemic hepatitis. Prodromal gastrointestinal symptoms were followed by 5 months fluctuant jaundice. The liver was enlarged to the umbilicus. Serum bilirubin at the time of biopsy was 4·4 mg. per 100 c.cm. The jaundice subsided during the next 7 weeks and the patient has since been symptom-free. The biopsy shows a very chronic lesion with the liver cells split up into groups by the fibrous tissue, early nodular hyperplasia, and bile-duct proliferation in the fibrous portal tracts—i.e., a picture of cirrhosis (fig. 12).

4. *Mild residual fibrosis.*—In the process of healing a periportal, zonal fibrosis obviously creates greater obstacles to complete histological restoration than the diffuse lesion with perfectly preserved reticulin framework. Case 5 is of considerable interest in this respect (figs. 7 and 8). At the time of the last biopsy, in spite of the persistence of a little periportal scarring, the jaundice had already undergone complete cure. We have observed similar residual fibrotic lesions in the portal tracts in 9 cases, 21–51 days from the onset of the jaundice. All these cases ultimately recovered. We have already mentioned the probable ultimate complete resolution of this degree of fibrosis. The reversible fibrosis produced experimentally in animals by Cameron and Karunaratne (1936) may be recalled in this connexion.

† Further reference to this case, with another photograph, is made in *Brit. Jour. ven. Dis.* (in the press).

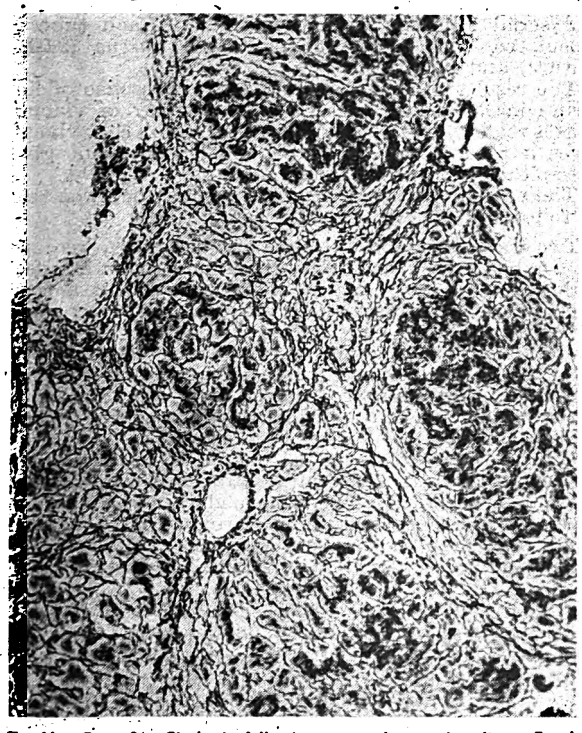

Fig. 11.—Case 8. Cirrhosis following arsenotherapy jaundice. Foot's reticulin stain showing islets of liver cells isolated by fibrous tissue rich in reticulin fibres. (× 60.)

Fig. 12.—Case 9. Epidemic hepatitis. The picture is that of cirrhosis. Best's carmine stain. (× 45.)

DISCUSSION

The question may be raised whether these small biopsy specimens, of average size 2 × 20 mm., are representative of the liver as a whole. The sections usually enabled us to examine some 10 to 20 lobules, and while there is slight variety of intensity of inflammation, the histology is remarkably uniform in any one case. Our autopsy material supports this view. Pathologists, however, have not infrequently noted that in fatal cases the left lobe of the liver is more necrotic than the right (e.g., Stewart 1917).

Our material is in accord with the mass of evidence pointing to hepatitis as the pathological basis of epidemic jaundice (Eppinger 1922, Nordmann 1925, Gaskell 1933, Barber and Osborn 1939, Roholm and Iversen 1939). The old view of Virchow (1865) that the jaundice was due to obstruction of the ampulla of Vater by a plug of mucus need no longer be considered. By intubation studies, Van Rooyen and Gordon (1942) found no evidence of duodeno-biliary catarrh.

The mechanism of production of icterus is a matter of some interest. The disruption of the liver-cell columns with their intercellular bile canaliculi may create a form of obstruction to bile flow. The isolation of liver cells may also lead to the excretion of bile into the surrounding tissue spaces. It is also obvious that the degree of damage may be such that the surviving liver cells are quantitatively inadequate to excrete the bile pigment brought in the blood-stream. Histologically, pigmented cells are seen especially at the centre of the lobule. Some of these are obviously necrotic, while

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others have lost their glycogen. The latter may accumulate bile because they are unable to excrete it, while the former become pigmented in consequence of their death. The affinity of dead tissue for bile is a common pathological phenomenon. Further out in the lobule we meet with "bile thrombi" (fig. 10), the finest intercellular canaliculi being filled with accumulated bile which has obviously failed to escape. There is an absence of evidence of any bile stasis in the interlobular branches of the bile-ducts, suggesting that, if any obstructive factor exists, it is intralobular.

The material studied has consisted of hospital cases which may be more severe than many milder cases treated at home. Our mildest and most transient case, however (case 6), had a very significant liver lesion. A striking feature has been the remarkable severity of the pathological picture. Several of the cases seem to have been verging on acute liver necrosis—12 out of 56 cases showed histological damage of more than 50% of liver cells—yet the normal course is to complete recovery. Fatal or permanent damage is rare.

The frequency with which a periportal "cirrhosis-like" picture is encountered leaves little doubt that it constitutes one pathological form of acute hepatitis. Roholm and Iversen (1939) also noted this appearance, but were uncertain whether it represented an old-standing hepatitis with jaundice resulting from an acute exacerbation. That acute and subacute necrosis and cirrhosis could follow epidemic hepatitis has been recognised previously (Bergstrand 1930, Cullinan 1936, Krarup and Roholm 1941). Our studies further emphasise this sequence.

The relationship of hepatitis to arsenotherapy and serum inoculations is discussed elsewhere (Dible and McMichael 1943, Hawley, McFarlan, McMichael and Dible 1943).

SUMMARY

The pathology of 56 cases of acute hepatitis has been studied by aspiration biopsy.

The inflammatory lesions may be diffuse, zonal or mixed. Jaundice persisting over 2 weeks is more likely to be due to a zonal lesion.

Diffuse hepatitis usually heals completely and rapidly. When the disease runs a longer course some residual fibrosis in the portal zones may still be present after apparent clinical cure.

We have found no evidence that there is a form of jaundice due to duodenal catarrh and obstruction of the common bile-duct by mucus.

The process of development of acute and subacute necrosis and cirrhosis has been followed.

No histological criteria have been found for the differentiation of the lesions resulting from epidemic hepatitis, arsenotherapy and serum inoculations.

We are indebted to the Medical Research Council for an expenses grant for technical assistance; to Brigadier T. E. Osmond and Major James Marshall for many of the cases of NAB jaundice; to Mr. J. R. Baker and Mr. J. C. Griffin for the histological preparations; to Mr. E. V. Willmott for the microphotographs; and to our colleagues in this school for their coöperation.

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BURNS TREATED WITH VIACUTAN

WITH SPECIAL REFERENCE TO THE FACE AND HANDS

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THE success of coagulation therapy with tannic acid is so well known as to need no reiteration. Tannic acid however has two disadvantages: (*a*) a contractile effect which makes its use hazardous in burns of the face and hands, and (*b*) its toxicity. Since we consider coagulation the method of choice, especially under war-time conditions, we have tried to eliminate these disadvantages.

The ideal substance for treating burns would be, in our opinion, a compound which would:—

(1) Penetrate the skin epithelium and coagulate tissue proteins sufficiently to prevent loss of fluid.

(2) Form a resistant yet flexible coagulum.

(3) Kill, or inhibit the growth of, organisms, not merely on the burnt surface but also in subjacent tissues.

(4) Form an aqueous solution with a low surface tension allowing it to flow into the folds of the skin.

These properties can be claimed for 'Viacutan,' which has been employed at Walsall General Hospital for over a year with excellent results. It is silver dinaphthylmethane disulphonate used as a 1% solution adjusted to a pH of 4·5. This solution possesses a slight brown fluorescence and remains stable when kept away from strong light.

ANTIBACTERIAL PROPERTIES

The antibacterial activity of viacutan was examined by the usual technique in broth cultures. Table I shows that it stops growth of these organisms in a dilution of 1 in 16,000. Phenol will not stop the growth of proteus in dilutions of less than 1 in 800; hence the bactericidal and bacteriostatic activity of viacutan against this organism is about 20 times that of pure phenol.

Its antibacterial activity was further examined in media consisting of (*a*) broth 90% and horse serum 10%, and (*b*) broth 50% and horse serum 50%. 1 c.cm. viacutan solution was added to 10 c.cm. of the medium and serial dilutions were then made. Each tube was inoculated with a loopful of *Staph. aureus* (24-hour culture) and incubated.

The results (table II) show that the presence of horse serum increases the bacteriostatic activity of viacutan. This is readily explained by the observation that viacutan gives a precipitate with broth but it does not give a precipitate with broth-serum medium.

The antibacterial activity of the substance was tested as follows in experimental burns:

Two burns, each about the size of a halfpenny, were made on a rabbit's back under anæsthesia and each was infected with *Staph. aureus*. One of these was used as a control and was covered with sterile gauze; the other was sprayed with viacutan three times during the day and covered with gauze soaked in viacutan during the intervals of spraying. After 24 hours the treated burn appeared dry, coagulated and healthy, whereas the control burn was exuding pus. Smears taken from the treated burn gave no colonies, whereas those taken from the control burn showed a heavy growth of staphylococcus when plated out in the usual way. At the end of 24 hours the control burn itself was treated by repeated applications of viacutan and then each burn was covered with gauze soaked in viacutan. Both healed in 8–11 days. (The control burn was treated after 24 hours with viacutan in order to spare suffering to the rabbit.)

PHARMACOLOGICAL PROPERTIES

Tanning effect.—Cubes of longissimus dorsi muscle of rabbit were immersed in the following solutions adjusted to pH 4 for 48 hours:

(*a*) Viacutan 1%; (*b*) tannic acid 1%; (*c*) distilled water. They were then separately suspended on waxed cotton in test-tubes containing 1% pepsin in N/100 hydrochloric acid and all the tubes were placed in the incubator.

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After 5 days it was observed that :—

In (*a*) the muscle cube was unchanged and unattacked.
In (*b*) the muscle cube was unchanged and unattacked.
In (*c*) the muscle cube was almost completely dissolved.

This showed that viacutan coagulates protein sufficiently to resist lysis by proteolytic enzymes.

Velocity of penetration.—Similar cubes were immersed in 1% viacutan solution, and 1% tannic acid. They were examined after 12, 24 and 48 hours, and those immersed in viacutan were found to be white, resistant and slightly coagulated, but much less contracted and more flexible than those immersed in tannic acid. The viacutan preparations were sectioned and treated on a slide with metol-hydroquinone in order to change the silver present in the viacutan molecule into the metallic state and render it visible as a black marginal rim. The tannic-acid controls were similarly developed with ferric salts. After 48 hours' immersion in viacutan the depth of the black rim, measured with an eyepiece micrometer, was just over 3 mm., while after 48 hours in tannic acid it was of the order of 0·3 mm. This difference in the depth of the black rim remained constant in a series of sections examined, and it was concluded that the viacutan solution penetrates about 10 times as fast as tannic acid.

TABLE I—GROWTH OF VARIOUS ORGANISMS IN BROTH CULTURES CONTAINING VIACUTAN IN VARIOUS DILUTIONS

Dilution 1 in—	1000		2000		4000		8000		16,000		32,000	
Hours ..	24	48	24	48	24	48	24	48	24	48	24	48
S. pyogenes aureus ..	−	−	−	−	−	−	−	−	−	−	−	+
Bact. coli	−	−	−	−	−	−	−	−	−	−	−	+
Gaertner's bacillus ..	−	−	−	−	−	−	−	−	−	−	+	+
Proteus	−	−	−	−	−	−	−	−	−	−	+	+

Action on normal skin.—Areas of a rabbit's back were shaved. Half were treated with viacutan 1%, the other half with tannic acid 1%. The dressings were continuously saturated with the solutions for 36 hours, and were then removed, after which the areas were painted every 4 hours for a further 24 hours. The skin treated with viacutan was brown and harder than normal but was considerably more flexible than the skin treated with tannic acid. Microscopical examination revealed that the silver had penetrated to an average depth of 0·3 to 0·5 mm.; isolated deposits could be detected as deep as 1 mm. below the surface in the region of the hair follicles. Where the skin had previously been damaged by superficial cuts the penetration was not deeper than that in the undamaged skin. There were no indications of absorption of silver by the blood and no trace of silver in any organs.

TABLE II—GROWTH OF *Staph. aureus* IN SERUM MEDIA CONTAINING VIACUTAN IN VARIOUS DILUTIONS

Dilution in 1000ths—		8	16	32	64	125	250
Medium (*a*)	24 hours	−	−	−	−	+	++++
	48 hours	−	−	−	+++	++++	++++

Dilution in 1000ths—		8	16	32	64	125	250	500
Medium (*b*)	24 hours	−	−	−	−	−	++	++++
	48 hours	−	−	−	−	++	+++	++++

Action on burnt skin.—Areas of a rabbit's back were shaved and then burnt with hot oil. Half the burnt areas were treated with viacutan 1%, the other half with tannic acid 1%. Viacutan produced a coherent, flexible but resistant layer, not given to cracking. The contractile effect, and the scar tissue ultimately formed, were considerably less noticeable than with tannic acid, and regeneration of the tissue which was destroyed to varying depths was quicker than with tannic acid. When applied to the eye of a rabbit neither 1% viacutan nor 1% tannic acid produced coagulation or any noticeable damage to the cornea. In 2% strength the difference was conspicuous; the tannic acid caused corneal turbidity, conjunctival inflammation and mucopurulent discharge, but these were much less with viacutan.

CLINICAL APPLICATION

All patients were given the same local treatment. Inpatients admitted because of the extent or site of the burns were given the usual general treatment, including morphine, heat, and fluids. With small burns preoperative morphine was found to be sufficient. With larger ones 'Pentothal Sodium' was the anæsthetic of choice for adults, and minimal ethyl chloride and ether, given by the open method, for children.

The routine of local application was as follows :—

The burnt area was cleaned with warm normal saline, the blisters were cut away and the raw surface was again washed with saline and dried. Viacutan was then painted on the whole area and surrounding normal skin.

Inpatients were returned to bed under a heat cage and further application was made 6–12 hours later. If moist areas were found at any time, more viacutan was applied. An electric hair-dryer was used to hasten the drying of the coagulum. A suitable alternative is the application of sterile powder, such as zinc oxide and starch or sulphanilamide.

For outpatients the viacutan was applied on a single layer of gauze mesh, and before bandaging this was left a short time to let it dry. The gauze could usually be removed in 24–48 hours without disturbing the coagulum, but if it was adherent it was allowed to remain.

The coagulum separates after 8 to 12 days, depending upon the severity of the burn. In several cases sterile pus—mainly tissue debris—caused separation of the central part of the coagulum after a few days, but there was no sign of inflammation and the time of healing was unaffected. Where parts of the burn were third degree the whole area was treated with viacutan. Epithelialisation of the small third-degree areas was rapid and there was so little scarring that skin-grafting was unnecessary.

These observations have been made in more than 80 cases, including many burns of the hands and face. The following are representative :—

OUTPATIENTS

CASE 1.—Aged 29. Several small scalds of back, second degree. Some were treated with viacutan and others with 'Tannafax.' The former healed in 10 days, whereas the tannafax coagulum was still adherent after 14 days.

CASE 2.—Aged 15. Second-degree burns of four fingers. Two were treated with viacutan, two with triple dye. The viacutan allowed more freedom of movement and the burns were healed in 10 days, compared with 14 days for the triple dye.

CASE 3.—Aged 23. Second-degree scalds extending over the whole volar aspect of the forearm. Healed in 9 days.

CASE 4.—Aged 4. First- and second-degree scalds of foot and dorsum of the ankle excluding the toes and part of the sole. Here the coagulum took 13 days to separate, the wound being completely healed.

CASE 5.—Aged 9 months. Second-degree burn of the distal half of the palm and the fingers to the 1st interphalangeal joints. Healed in 9 days with complete freedom of movement.

CASE 6.—Aged 13. Scalds of lower two-thirds of the anterior surface of the leg—second degree. Viacutan was applied on the two succeeding days; the eschar had separated and epithelialisation was complete in 8 days.

CASE 7.—Aged 20. Mixed second- and third-degree burn of the whole palm of the hand and volar aspect of wrist. Except for small areas of the third-degree burn on the thumb, healing was complete in 17 days.

INPATIENTS

CASE 8.—Aged 15. Second-degree burns of both hands. Right hand: burn extending from proximal interphalangeal joints dorsally over the hand to 3 inches above the wrist. Left hand: whole extent of dorsum of fingers to just above the wrist. The burns were 24 hours old and previously treated with flavine dressing, without removal of blister. Coagulum began to separate after 8 days; separation complete in 14 days, with immediate full movement of fingers.

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CASE 9.—Aged 15. Second-degree burn of the whole of the right hand and forearm, to 2 inches above the elbow. Second-degree burn on the right side of face involving the ear. Viacutan applied three times during the first day, and to various moist small areas during the three following days. The eschar on face separated and epithelialisation was complete in 8 days. Movements of the arm were free throughout and the eschar separated after 11 days, leaving two small areas, one on the forearm and one on the wrist (third degree) which had still to heal. These were dressed with ung. zinc. oxid. et eucalypt. and were healed with a little scarring in a further 12 days. Absent from work 4½ weeks.

CASE 10.—Aged 1 year. Second-degree burn involving face, neck and right hand. Coagulum separated after 7 days leaving a small septic area on the neck. Viacutan was reapplied and healing was complete without any scarring, after a further 7 days.

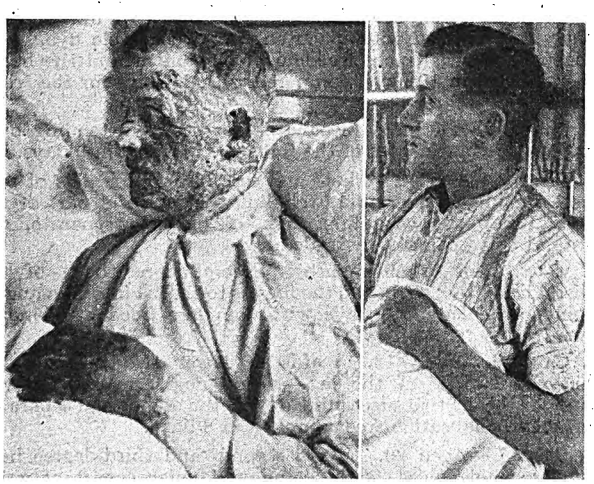
CASE 11.—Aged 40. Second-degree petrol burns of whole face, ears, neck and both hands to above the wrist. The coagula began to separate after 10 days. Separation was complete in the next two or three days, apart from the region of the lips and ears where healing took place in a further 10 days. There was no trace of scarring and the patient had immediate full movement of the affected part.

CASE 12.—Aged 16. Very extensive deep burns (second and third degree) of the whole right arm and shoulder girdle, whole right leg and buttocks and part of abdomen. Applications of viacutan resulted in a good coagulum and his condition improved considerably. After 10 days the coagulum on the second-degree areas commenced to separate; on the 15th day after the accident, the patient developed pneumonia and died.

CASE 13.—Aged 10. Scald of the back (2 × 3 in.) three days old and septic on admission. The coagulum started to separate after 7 days and there was complete healing in 11 days. Despite the sepsis, the initial treatment was as previously described.

CASE 14.—Aged 36. Second-degree petrol burns of both hands involving fingers and the forearm with small patches on the upper arms and right scapular region. First- and second-degree burns on the whole right side of the face. Separation began on the face after 5 days, and was complete in 12 days. The eschar separated from the hands and arms after 16 days. Complete healing without scarring. Discharged after 24 days.

CASE 15.—Aged 10 months. Second-degree scalds right side of face including eyelids, upper arm and part of chest. After 13 days the coagulum had separated and there was no scarring. In this case viacutan was instilled into the eye with no ill effects whatsoever.



Case 17—24 hours after first application. After three weeks.

CASE 16.—Aged 36. Second-degree burns both legs and right hand; third-degree burns, with separation of nails, involving the whole of the left hand and part of the right leg. All second-degree burns healed rapidly and the coagulum had separated in 16 days. The coagulum on the third-degree burns separated slowly by the accumulation of underlying sterile pus. After 4 weeks the coagulum was removed and ung. zinc. oxid. et eucalypt. was applied. A fortnight later epithelialisation was complete with very little scarring. After 8 weeks he had regained practically full movement of the hand and fingers.

CASE 17.—Aged 38. Second-degree petrol burns, 6 hours old, of the whole face, left hand and part of the right hand. The coagulum on face separated completely in 17 days and that on the hands in a further 5 days. There was no scarring and the period of disability was 4 weeks. (See figure.)

CONCLUSIONS

In our experience silver dinaphthylmethane disulphonate ('Viacutan') has important advantages for the local treatment of burns: (1) It is easily applied. (2) It rapidly relieves pain. (3) After its application there is very little œdema or immobilisation of the affected part, and it can be used for the face and hands with complete safety. (4) Healing is quick and there is no subsequent scarring or disability. (5) The patient requires little supervision and there is no staining of linen and hands. (6) It is bactericidal and bacteriostatic.

These properties make it suitable for both first-aid and hospital treatment.

We would like to express our gratitude to Mr. Robert Forrest, group officer and surgeon, EMS, for his advice and helpful criticism.

The compound used in our investigation was supplied by Messrs. Ward, Blenkinsop & Co., Ltd. Dr. Pick has to thank Dr. A. A. Goldberg, director of the research department of that firm, for valuable suggestions for the biological trials, and Dr. M. Mandelbaum for performing the animal experiments.

THROMBOCYTOPENIC PURPURA

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Thrombocytopenic purpura is a disease characterised by hæmorrhages from the mucous membranes into the skin and other organs, a reduced platelet-count, a prolonged bleeding-time and decreased capillary resistance but a normal coagulation-time. Patients admitted to the London Hospital with this disease during 1927–38 inclusive have been studied, and were followed up until the outbreak of war. Twelve have been further traced and had clinical and blood examinations in July, 1942. In all there were 75 cases, age and sex being as shown in figure and table A.

The disease is thus about evenly divided between the two sexes before the age of puberty; above that age there is a preponderance of 5 females to 1 male. There is a peak in early adult life and again at the menopause. The incidence of the disease in the first decade of life has been stressed by various writers; Rosenthal (1939) assessed it at 29% of the total, and Wintrobe and his colleagues (1937) at 36·2%; in the present series 30% of cases came in this decade. It is preferred here, however, to make the division at 15 years, as representing puberty, and in this series 40% occurred under that age.

PREPUBERAL GROUP

Of the 30 cases under 15 years, 5 could not be traced, 5 died as a direct result of the disease during the period of observation, 15 had no symptoms and no thrombocytopenia at the end of the period, and in 6 symptoms of thrombocytopenia persisted after 1939. The disease was observed to persist after the age of 15 in 2 boys and 2 girls. Of the fatal cases, 3 died with a subdural hæmorrhage, 1 with a severe hæmoptysis and 1 with a septic meningitis after chronic mastoiditis (table I).

The analysis shows that this is a serious disease, carrying a high mortality (16%). The presenting symptoms were: bleeding from the gums, 8 cases; epistaxis, 10; generalised purpura and ecchymoses, 16; hæmaturia, 4; melæna, 3; hæmoptysis, 1; hæmatemesis, 3; hæmarthrosis, 1; retinal hæmorrhage, 1; and subdural hæmorrhage, 3 cases. The bleeding may be severe—in 9 instances the red-cell count fell below 2 million per c.mm. and in one instance as low as a million. The platelets usually fall during an exacerbation to below 10,000 and the bleeding-time is prolonged to 30 minutes or more. In the chronic cases there may be remissions in which there are no symptoms, but the platelets rarely

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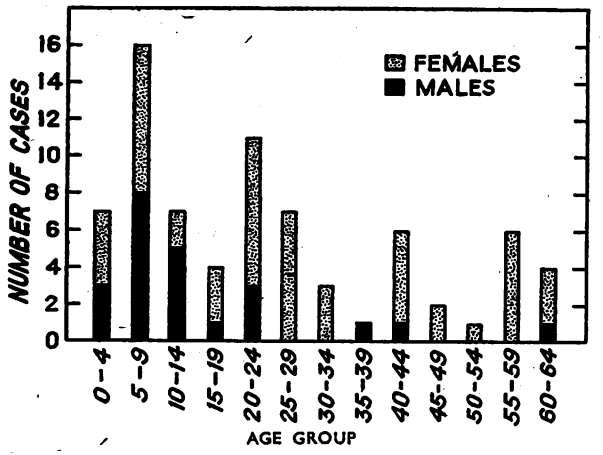

Age and sex distribution in 75 cases of thrombocytopenic purpura.

TABLE A

Age in years		M.	F.	Age in years		M.	F.
0–15	0– 4 ..	3	4	Over 40	40–49 ..	1	7
	5– 9 ..	8	8		50–59 ..	..	7
	10–14 ..	5	2		60–69 ..	1	3
	Total ..	16	14		Total ..	2	17
16–34	15–19 ..	1	3				
	20–29 ..	3	15				
	30–39 ..	1	3	M = male; F = female.			
	Total ..	5	21				

rise above 100,000 and the bleeding-time remains at 5 minutes or more. In most cases there was a moderate leucopenia with relative lymphocytosis.

Rosenthal (1939) found that 22 out of 58 cases under the age of 20 made a spontaneous recovery; in our series 10 (5 of each sex) out of the 30 cases under 15 recovered spontaneously, the platelets rising and remaining at normal levels and the bleeding-time not being increased.

TABLE I—PREPUBERAL CASES

MALES

Age (years)	Cases	Persisted		Recovered		Died	Not traced
		Without splenec.	With splenec.	Without splenec.	With splenec.		
0– 4	3	..	..	2	1	..	..
5– 9	8	1*	..	3	1	2	1
10–15	5	1†	..	..	3	1	..
Total	16	2	..	5	5	3	1

FEMALES

0– 4	4	..	1*	..	..	..	3
5– 9	8	..	3‡§	4	..	1§	1
10–15	2	..	..	1	..	1	..
Total	14	..	4	5	..	2	4
All cases	30	2	4	10	5	5	5

* To the age of 14. † To the age of 27. ‡ To ages 6, 7, and 24. § 1 year after splenectomy at age of 6. Splenec. = splenectomy.

POSTPUBERAL GROUP: FEMALES

Females over 15 accounted for more than half of the cases admitted (38 out of 75). It is evident from tables I and II that the disease takes a much more severe form in women than in children: in women the mortality (16 deaths in 38 cases) is extremely high and the likelihood of spontaneous recovery extremely small (1 case out of 38). The ages given are those at which the patient was first seen, but in this group there was only one who dated her symptoms from before the age of 15—at 13 years. In only 2 others did symptoms start before the age of 20—at 17 and 19. This further stresses the possibility of spontaneous cure in childhood. The symptoms in this group were similar to those in children with the important addition of menorrhagia; this was constant and severe in all cases arising before the menopause. In addition 3 cases showed retinal hæmorrhages, 1 a labyrinthine hæmorrhage, 1 jaundice, 3 headache, 1 jacksonian epilepsy and 1 aphasia.

Pohle (1939) has shown that the number of platelets in normal women slowly and progressively falls during the 14 days before menstruation and rapidly rises soon after its onset. It is not surprising, therefore, that severe menorrhagia should be such a prominent feature of the disease. We cannot help feeling that the key to ætiology lies in this clinical observation. Further evidence pointing in this direction is provided by a patient who became pregnant. During her pregnancy the symptoms gradually disappeared and in the eighth month her platelet-count was 770,000 and bleeding-time 2½ min. After delivery the symptoms reappeared and the platelets returned to their former low level. This is not a constant finding in pregnancy complicating thrombocytopenic purpura. Rushmore (1925) gave an account of 47 patients in whom thrombocytopenic purpura complicated pregnancy, in 43 of whom the purpura developed at or after 4½ months. De Saussere and Townsend (1935) brought the total up to 55 and showed there was a mortality of 51%. Sanford, Leslie and Crane (1936) reported 11 instances in which the infant also manifested purpura. Williamson (1942) reported an established case of thrombocytopenic purpura in a woman whose platelets remained at 50,000 throughout gestation; the baby had purpura with a platelet-count of 40,000 on the 14th day of life, but has been normal since. A woman reported by Urbanski and Hunter (1942), who had had thrombocytopenic purpura since the age of 14, had a stillbirth and splenectomy was subsequently done; after this she had 3 live children, the first of whom showed signs of purpura for a short time; the mother's platelets were low throughout.

Another pointer towards an endocrine origin of the disease is the relatively high incidence of thyrotoxicosis in women with thrombocytopenic purpura over the age of 40 (3 out of 17). Bomford and Rhoads (1941) drew attention to the association of the refractory anæmias with endocrine disturbances; in their series there were 2 eunuchs and 2 patients with hyperthyroidism. In 4 women the first symptoms of anæmia appeared at or near the menopause; in 2 more there was a history that the symptoms were more severe at or shortly before menstruation. They suggested that

"A working hypothesis of the ætiology of refractory anæmia is that the disorder is due to a conditioned susceptibility to toxic substances, usually exogenous or endogenous aromatic hydrocarbons, associated with hepatic disfunction, a failure of biochemical mechanisms of detoxication and the circulation of hæmolytic substances, and that these hæmolysins cause either an abnormal form of hæmolysis and thus an abnormal reaction in the marrow or that they destroy both circulating red cells and developing cells in the marrow thus producing hypoplasia and other abnormal forms of marrow."

The platelets are the first component of the blood to be reduced in aplastic anæmia, so that it is not surprising that the differential diagnosis between aplastic anæmia and thrombocytopenic purpura is difficult. Spence (1928) wrote "there is no definite dividing line between thrombocytopenic purpura and aplastic anæmia, the one runs imperceptibly into the other." In thrombocytopenic purpura sternal puncture (not used in the cases reviewed here because they were admitted to hospital before it was a common procedure) usually shows a marrow picture of erythroblastic and megakaryocytic hyperplasia; but sometimes there is a considerable diminution of megakaryocytes which has been called megakarophthisis. This would be in accordance with the variations found by Bomford and Rhoads (1941) between the sternal-puncture and post-mortem pictures in their refractory anæmias. Generally speaking, the anæmia in thrombocytopenic purpura is more variable than that of aplastic anæmia and not so severe; white cells, in particular the polymorphs, are not so greatly reduced, whereas the platelets are lower and the bleeding-time is longer. It is worth comparing the averages in this series of thrombocytopenic purpura with those in the four types of refractory anæmia published by Bomford and Rhoads (1941) (see table B).

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TABLE B

Type		Red cells (million per c.mm.	Hb. %	White cells per c.mm.	Polys. %	Platelets per c.mm.
Refractory anæmia	1	1·8	40*	3640	54	169,000
	2	1·7	42	2250	40	58,000
	3	2·2	50	1850	20	79,000
	4	1·15	27	2013	38	304,000
Thrombo. purpura		2·7	57†	6860	57	27,000

* Estimated by Sahli's method.
† Before 1934 hæmoglobin estimations were made by Dare's method; after 1934 by photo-electric cell (Campbell Smith).

Occasionally in thrombocytopenic purpura there is a leucocytosis with an excess of lymphocytes; Minot (1936) drew attention to this and it was seen in 2 of our cases. The sex-distribution in the refractory anæmias recorded by Bomford and Rhoads was almost equal—type 1, 13 males to 17 females; type 2, 6 males to 5 females; type 3, 7 males to 5 females; type 4, 3 males to 1 female. Nevertheless, the mechanism which brings about refractory anæmia, working in milder degree and in females possibly only an exaggeration of a physiological process, may well bring about thrombocytopenic purpura.

POSTPUBERAL GROUP: MALE

The male group in this series is very small (table II). The manifestations in males seem to be much less severe than in females, but these 7 cases cannot be regarded as proving anything. There was only 1 death—from subdural hæmorrhage—which could be attributed to the disease; the other was an operative death from thyrotoxicosis in a man who had previously been cured of his thrombocytopenic purpura by splenectomy. There were 2 spontaneous recoveries. The symptoms were the same as those seen in childhood.

TABLE II—POSTPUBERAL GROUP

FEMALES

Ages	Cases	Dead	Subdural hæmorrhage	Spontaneous cure	Splenectomy				Unchanged	Thyrotoxicosis	Not traced
					Total	Cured	Op. deaths	Unchanged			
15–39 ..	21	7	1	..	9	4	2	3	6	..	2
40–69 ..	17	9	7	1	4	3	1	..	4	3	1
Totals ..	38	16	8	1	13	7	3	3	10	3	3

MALES

15–39 ..	5	1*	..	1	2	2	..	..	1	1	1
40–69 ..	2	1	1	1	..	..	..	..	..	..	..
Totals ..	7	2	1	2	2	2	0	0	1	1	1
All cases ..	45	18	9	3	15	9	3	3	11	4	4

* Following thyroidectomy.

SECONDARY THROMBOCYTOPENIC PURPURA

Thrombocytopenic purpura may be a symptom of many conditions, among the most important being refractory anæmia, leuco-erythroblastic anæmia, leukæmia, and toxic reactions to drugs.

During the period of this study, 4 cases of leuco-erythroblastic anæmia presented themselves as thrombocytopenic purpura; at the time the differential diagnosis was extremely difficult, but in subsequent analysis it is noticed that in each instance there were 1% or 2% of myelocytes in the blood. An autopsy was performed in all 4 cases, and the primary carcinoma was found in the stomach in 3 and in the lung in 1. Thrombocytopenic purpura may be difficult to tell from leukæmia in the outpatient, but in this series a full blood-count soon differentiated between the two conditions. True thrombocytopenic purpura is a manifestation of poisoning by various drugs, such as 'Sedormid,' neoarsphenamine, quinine, phenobarbitone and sulphathiazole. Of the many full accounts of cases arising from sedormid the latest is by Moeschlin (1942). In the London Hospital between 1927 and 1938 there were 5 cases resulting from NAB, 2 from quinine (one from the drug given by mouth and one from quinine urethane used in treating varicose veins), and 2 from phenobarbitone. None of these 9 cases are included in the total of 75 idiopathic cases. Rosenfeld and Feldman (1942) and Werner (1942) each recorded a case following the use of sulphathiazole. The differential diagnosis is not difficult—there is a history of the drug having been taken, and immediately it is stopped the symptoms disappear and the platelets and bleeding-time return to normal. Here an exogenous toxin is probably acting for a limited period in the same way as does the endogenous aromatic hydrocarbon already described.

TREATMENT

Various forms of treatment were tried in this series. In 6 cases vitamin C was used in full dosage, as suggested by Engelkes (1935) and Vaughan (1937), but no improvement was observed as a result; this is not surprising since Finkle (1937) showed that there was no evidence of vitamin C deficiency in thrombocytopenic purpura. Vitamin K was used in 2 cases but again no improvement was observed. Vitamin P of Szent-Györgyi (1936) was not tried. Witts (1931) has shown that liver therapy is unsuccessful, and no benefit was observed in the cases in this series where it was used. Deep X-ray irradiation was reported by Mettier, Stone and Purviance (1936) to achieve some success: but no improvement was reported by Davidson (1937), Vaughan (1937), Jones, Tocantins and Smith (1938) or Rosenthal (1939). Jennings and Castleden (1939) reported the case of a woman aged 33 in whom menorrhagia was the most prominent symptom and in whom splenectomy produced no benefit; they treated her with deep X-ray therapy and produced an artificial menopause. Deep X rays were not tried in the present series, and if our ideas on the ætiology are correct they would be not without danger. Rosenthal (1939) claims symptomatic improvement after the use of moccasin snake-venom, but has seen no change in the platelet-count or bleeding-time as a result of its use. This treatment was tried in 3 cases in the present series, but we were unable to observe any improvement, either symptomatic or in platelet-count or bleeding-time. Blood-transfusions with fresh blood carefully cross-grouped are a life-saving measure in severe cases, and are invaluable for preparing patients for splenectomy. Repeated small transfusions as used by Bomford and Rhoads (1941) in the treatment of refractory anæmia, however, seem to have no permanent effect on the course of the disease.

Berg and Rosenthal (1942) reported the failure of ligation of the splenic artery in 2 cases.

Splenectomy was first used in thrombocytopenic purpura by Kaznelson (1916) and since then has taken a prominent place in the treatment of the disease. Bedson (1924) showed that in animals splenectomy was followed for 48 hours by a rise in the platelet-count; this was maintained for 14 days and was followed by a gradual fall to normal in 3–4 weeks. It might be expected, therefore, that any improvement in the disease would be only temporary.

The spleen is not as a rule greatly enlarged: sometimes it is palpable, but usually not. The largest in this series weighed 1 lb. 7 oz. and the next 10½ oz. In 2 cases cholesterol ester histiocytosis in the pulp was reported.

Spence (1928) reviewed the results of splenectomy in the 101 cases of thrombocytopenic purpura published up till then and classified them as follows (table C).

TABLE C

—	Acute	Chronic	Unclassified	Total
Good results { No recurrences ..	2	61	6	69
Good results { Improvement ..	..	6	..	6
Poor results	10	5	..	5
Deaths		8	3	21
Total	12	80	9	101

Of these cases, 24 were males (10 under 15 years) and 64 females (20 under 15 years); in the remaining 13 cases age and sex were unstated. In our classification

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the results would read: total, 101; cures, 69; operative deaths, 21; unchanged, 11. His division into acute and chronic seems very arbitrary; it depends on the extent of the hæmorrhage, which in women largely depends on menorrhagia. The disease is one of relapses and remissions closely related to the menstrual cycle. There seems, therefore, nothing to be gained by this division. These figures do suggest, however, that the most ill patients are the ones least likely to be benefited by splenectomy. Eliason and Ferguson (1932) added a further 112 cases to Spence's 101, making a total of 213; of these, cures were reported in 73% and considerable improvement in 8%. The operative mortality was 13%. In their opinion 81% of cases benefit from the operation.

No attempt has been made to search for all the cases recorded since that time. Of the more important groups reported, Brown and Elliott (1936) studied 21 cases in which females predominated by 4 to 1; the results were as follows (table D).

TABLE D

—	With operation	Without operation	Total
Completely arrested ..	4	3	7
Much improved	4	0	4
Improved	1	2	3
Unimproved	0	5	5
Died	1	1	2
Total	10	11	21

Full details of all the cases are not given, but in the operation group there were 2 boys and 1 girl under 15. Vaughan and Wright (1939) reported 6 cases followed for more than 10 years, 2 males aged 3 and 22, and 4 females aged 13, 26, 30, and 42. They were all free from symptoms and had had no bleedings since the operations, and in 4 the platelet-counts were normal. Rosenthal (1939) describes 43 splenectomies but does not analyse them very fully. There were 7 postoperative deaths, a mortality of 16%, 29 have remained well and 3 have improved. "Clinical and hæmatological recovery," he says, "may take place in 50% of the cases." Pernokis (1942) reports 7 cases, of which 5 are living and well, one died at the operation and one died later, possibly of a recurrence due to hyperplasia of the accessory spleen noted at operation but not removed. Witts (1942), in a description of ulcer of the leg in thrombocytopenic purpura, reports 2 cases of splenectomy, one in a male that did not result in cure and one in a female that did. In correspondence following this paper, Williamson (1942) states that the 3 cases reported by Sutherland and Williamson (1925) and one further case of his did not result in cure; and Myers (1942) that all the 5 cases he reported in 1935 had remained cured until September, 1939. In their group of refractory anæmias, Bomford and Rhoads (1941) report 3 splenectomies without definite benefit. They consider the operation justifiable in cases with marrow of the partly mature cellular type where increased excretion of urobilinogen indicates hæmolysis, there is a high reticulocyte count, and the effect of transfusions appears to pass off particularly rapidly; in such patients they think hæmolysis may be slowed by splenectomy.

The results of splenectomy in the present series may be summarised as follows (table E).

TABLE E

MALES					FEMALES				
Age	No.	Cured	Op. deaths	Unchanged	Age	No.	Cured	Op. deaths	Unchanged
0–15	5	5	0	0	0–15	4	0	0	4
15–40	2	2	0	0	15–40	9	4	2	3
Over 40	0	0	0	0	Over 40	4	3	1	0
Total	7	7	0	0	Total	17	7	3	7

In the prepuberal group it was highly successful in the males, being performed 5 times with immediate and permanent cure in each instance, but in the females the only patients who showed persistence of the disease were the 4 who had had splenectomy; one case operated on remained thrombocytopenic but died of intercurrent infection a year later. It does not follow that removal of the spleen was responsible for the persistence of the disease in girls, since the operation was only performed on the severest cases, often with the aim of saving life; the figures do suggest, however, that there is a difference between the sexes as regards the effectiveness of splenectomy.

In the female postpuberal group splenectomy carries a high operative mortality (23%) with no certainty of cure. On the other hand, a cure did result in 7 of the 13 cases treated—and more often in patients over than under 40 years. In one case where it failed many spleniculi were present. It was performed on the most serious cases, often after repeated transfusions, as a life-saving measure. Both operative mortality and risk of not achieving cure (23%) have to be set against the ordinary mortality (under 40 33%, over 40 53%) and the risk of subdural hæmorrhage. One patient in this series, aged 46, recovered from her splenectomy and lost her symptoms, her platelets rose to 425,000 and bleeding-time fell to 1½ min.; but she died 3 months later from the subdural hæmorrhage which occurred before splenectomy was undertaken. In this group, splenectomy, it seems, should be undertaken only after due consideration; the best results are to be expected in older women. In the male postpuberal group there were 2 splenectomies with cure.

It is worthy of note that in the males, including children, the operative mortality in the whole series was nil, and the 7 splenectomies were all successful. Of the females less than half were cured. Nevertheless, in either sex splenectomy may be a life-saving measure, and is sometimes advisable in the hope of preventing subsequent subdural hæmorrhage.

SUMMARY

Of 75 cases of thrombocytopenic purpura treated at the London Hospital between 1927 and 1938, 30 occurred before puberty. These were equally divided between the sexes; 10 of them recovered spontaneously, splenectomy was successful in 5 males and unsuccessful in 4 females, and the mortality during the period of observation was 16%.

Of the 45 cases which occurred after puberty, 38 were females. Only one female made a spontaneous recovery; splenectomy was successful in 2 males and in 7 out of 13 females, and the mortality during the period of observation was 40%. Half of the deaths were due to subdural hæmorrhage.

In the whole series splenectomy was successful in 7 out of 7 males and in 7 out of 17 females; there were 3 operative deaths; splenectomy may be a life-saving measure and is sometimes advisable in the hope of preventing subdural hæmorrhage.

One patient showed a striking improvement during pregnancy. Thyrotoxicosis was associated with the purpura in 4 cases.

We are indebted to the physicians and surgeons of the London Hospital for allowing us to follow up the patients under their care, and to Mr. A. E. Clark of the registrar's department for his help in searching the records and tracing the patients.

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TWO COMPLICATIONS WITH TRICHLORETHYLENE ANÆSTHESIA

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THE two noteworthy incidents here reported occurred among a series of some 175 minor or major operations under trichlorethylene ('Trilene') anæsthesia, in patients ranging in age from 2 months to 63 years. Except for the comparatively frequent occurrence of tachypnœa, the difficulty of obtaining deeper levels than III$_1$ (Guedel), and two cases of severe postoperative vomiting with transitory loss of taste, the remainder of the series was uneventful.

CASE 1

A healthy man of 22, very muscular and emotionally well-controlled, was admitted to the surgical outpatient department of the Royal Infirmary for reduction of a Pott's fracture. There was nothing peculiar either in his medical history or in his pre-anæsthetic clinical examination. No premedication was given. Induction with nitrous oxide and oxygen was smooth. Trilene from the chloroform bottle of the Boyle's machine was added to produce the necessary muscular relaxation. About ℥ 60 of trilene was used, and, except for a definite but transitory rise in respiratory rate without any cyanosis, anæsthesia seemed to be quite normal. When the manipulation was finished and the plaster applied, but not yet hardened, the patient was allowed to come out of the anæsthetic with the gas reduced and oxygen increased. Presently the patient started moving, and suddenly a few clonic convulsions of the hands and arms set in, followed by tonic convulsions and respiratory arrest. Cyanosis supervened rapidly, with trismus. An airway was inserted and artificial respiration with oxygen insufflation started without result. This stage might have lasted between 1 and 2 minutes. Then suddenly the finger-nails blanched, the pulse, which up to then had been full and slow at 60 per minute (normal rate 66–70) and apparently regular, became impalpable, and the face became greyish. While nikethamide was being prepared for injection, the heart region was slapped with a cold wet towel. After this slapping had been done twice the heart restarted, the colour improved, and the pulse became palpable and returned to its normal rate within a few seconds. Oxygen was administered by rhythmical compression of the bag and the patient's normal colour was restored immediately. Nikethamide was not required. Oxygen was continued for another five minutes. Recovery of consciousness was slightly retarded. There was a little retching, but no actual vomiting and the patient was fully awake and dressed 20 minutes after all this had happened. He was kept in and observed for several hours and seen on frequent return visits. There were no after effects except for a slight headache within the first hour.

It is difficult to say whether the syncope in this case was due to anoxia of the heart muscle secondary to the convulsions and respiratory arrest, or to a primary chloroform-like action of trilene on the heart, either of them being able to cause or predispose to ventricular fibrillation. Any definite judgment on the effect of trilene on the conductive and automatic action of the heart in man must be postponed until routine electrocardiographic tracings have been made on a large number of cases under various operative procedures.

CASE 2

A child of 1½ years, coming to operation for inguinal hernia, premedicated with gr. ½ of phenobarbitone and gr. 1/100 of atropine, was anæsthetised with nitrous oxide, oxygen and trilene, on the closed-circuit CO_2-absorption unit. A rash appeared during induction, which was so unusual that I sent a messenger to the ward to ask the nurse if any rash was observed when she was washing the patient; she had seen none. The spots were scattered on the abdomen and chest and fairly symmetrical on the front of both thighs. There was no tendency for the spots to run together, as in an ether rash, except slightly on the thighs. It was maculopapular in type, slightly raised, and did not disappear on pressure; the colour was brighter than that of an ether rash. On deepening the anæsthesia the rash disappeared gradually.

Schwartz and Russel,[1] reporting the effects of trichlorethylene on the skin, say: "It is also a sensitiser and can cause a more or less generalised acute eczematoid type of dermatitis, which begins as an erythema, becomes papular, then vesicular and is followed by oozing, crusting and desquamation."

I wish to thank Dr. John Gillies for his encouragement and advice; and Mr. J. F. Curr, Mr. A. R. Coe and Mr. A. B. Wallace for permission to publish the case-reports.

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Medical Societies

ASSOCIATION OF CLINICAL PATHOLOGISTS

AT the summer meeting of the association held in Cambridge four of the papers, though embracing recent work by the authors, were essentially reviews of subjects of current importance.

Dr. DOUGLAS MCCLEAN brought up to date the work on the part played by the "*spreading factor*" or mucolytic enzyme, hyaluronidase, in the decapsulation of streptococci (*J. Path. Bact.* 1942, **54**, 284), in fertilisation (*Nature, Lond.* 1942, **150**, 627), and in the early diagnosis of anaerobic wound infection (*Lancet*, 1943, i, 355, 707).

Dr. C. H. ANDREWES, FRS, spoke on *typhus*, and divided the varieties of the disease into three groups. (1) Type OX19 includes classical typhus, endemic typhus, Mexican typhus, Brill's disease and shop typhus (Malaya), with the louse and rat flea as vectors, and all giving good agglutination with OX19 but very little or none with OX2 or OXK. (2) Type XK includes tsutsugamushi, scrub typhus (Malaya), mite fever (East Indies), with the mite as vector, and agglutinating well with OXK but not with the other two antigens. (3) Type undetermined includes Rocky Mountain spotted fever, Sao Paulo typhus, fièvre boutonneuse, tick-borne typhus of South Africa, India, Kenya, all carried by ticks and giving poor agglutination with all three classical antigens. He mentioned the latest League of Nations survey (*Bull. Hlth Org. LoN*, 1943, **10**, No. 1).—Major JOHN BOYCOTT gave some details of typhus in Ireland.

Dr. P. L. MOLLISON discussed the *interpretation of Rh tests*. So far 88 mothers whose infants were affected with hæmolytic disease had been tested. Of these, 85 were Rh-negative and only 3 Rh-positive. Anti-Rh agglutinins were found in the sera of 82 of the 85 Rh-negative women. In these cases the peak of the immune response to the Rh agglutinogen was usually reached between the fifth and twentieth days after delivery, and this was therefore the most favourable time for examination. In 2 of the cases in which the mother was Rh-positive the destruction of the fœtal erythrocytes was apparently due to very potent immune anti-B agglutinins.—Dr. GERTRUD PLAUT dealt with the clinical importance of the Rh factor, and Dr. G. L. TAYLOR demonstrated the technique.—In the discussion Dr. E. N. ALLOTT asked whether there was any genetic linkage in the inheritance of the ABO and Rh groups; Dr. MOLLISON replied there was none.—Dr. F. A. KNOTT showed a series of tables summarising *methods and media for the detection of pathogenic anaerobes*. The use of Fe media, neutralisation of sulphonamide and suppression of contaminants, media giving good growth without anaerobe jars, and methods of identifying the specific toxins, all help to detect the presence of pathogenic strains without first going through the time-consuming process of isolating pure cultures. The early detection of hæmolysin and of ferments such as lecithinase and hyaluronidase may give a valuable early indication whether infection is likely to spread. The results in

1. Schwartz, L. and Russel, J. P. *Publ. Hlth Rep., Wash.* 1941, **56**, 1581.

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animal work give promise of value in the management of wounds in man. Dr. Knott stressed the usefulness of the revised edition of the MRC War Memo No. 2 (Diagnosis and Treatment of Gas Gangrene) to workers in this field.

Dr. O. C. LLOYD, who showed about 20 sections of *endometrium*, both normal and pathological, said that *biopsy* is of value in the diagnosis of abortion and of malignant disease as well as in sterility and menorrhagia. In these latter conditions it is advisable to have a biopsy between the 18th and 20th day of the cycle, for early secretory differentiation may reveal relative deficiency of the action of the luteinising hormone on the endometrium.

Colonel JOSEPH TURNER, USAMC, described the development of *cold agglutinins for human red cells in atypical pneumonia*, when no pathogenic microbe or virus can be demonstrated and there is little or no leucocytosis. The tubes are kept in the ice-box overnight before reading; an agglutinin titre of 1:2000 after 16–18 days has been recorded. The titre persists well into convalescence and is not affected by sulphonamide treatment.

Dr. JOSEPH UNGAR described the *immunisation of animals with TAB bacilli* grown on synthetic media. No correlation was found between the degree of local or general reaction and the level of serological response, blood groups or Forssman's hæmolysin. He said that the alcohol-killed material is highly promising.

Dr. NORAH SCHUSTER described *malignant cells in wet films of sputum*; methylene-blue 0·5% in 20% watery solution of glycerin stains the fresh sputum well. Experience is necessary for identification. In 178 cases, carcinoma was diagnosed 100 times. Malignant cells were missed 18 times and a correct diagnosis was made 85 times.—Dr. D'ARCY HART, on behalf of the MRC, asked for specimens of tuberculous tissue or pus likely to contain bovine bacilli, for a combined inquiry into the incidence of bovine tuberculosis in the community.

Dr. F. DURAN-JORDA discussed the formation of red blood-cells (*Lancet* 1943, i, 513; 1943, ii, 186).

Squadron-Leader E. M. DARMADY has found the *intravenous hippuric acid test* useful in differentiating toxic goitre from anxiety neurosis. The serial test in jaundice gives a satisfactory estimate of probable damage which is useful in prognosis and treatment. It is essential to use a two-hour reading. The estimation of hippuric acid as modified by Prorstein is imperative for comparable readings.

Dr. E. N. DAVEY showed specimens from a baby seven weeks old, which had developed during life a slough from thigh to navel and also behind the ear. The mother, who was Schick-negative, yielded the same type of *C. diphtheriæ* as that obtained from the child's lesions, the mother being infected in nose, throat and vagina. Apparently the child was protected by the maternal antitoxin in the milk so long as it was breast-fed. It died nine days after the cessation of breast-feeding.

Mr. L. J. HARRIS, DSC, demonstrated the *vitamin balance* in certain conditions. In pneumonia and particularly in convalescence vitamin A is needed in large quantities; during lactation the mother excretes daily in the milk a large amount of vitamin A.

New Inventions

SCREW LENGTH IN BONE GRAFTING

IT is often difficult during bone-grafting and plating operations to estimate the correct length of screw needed to reach exactly to the further cortex of the bone. A simple instrument has therefore been devised for measuring this accurately. It consists of a stilette, notched near the tip rather like a crochet hook, and a sliding pointer which indicates on a scale the depth of the drill hole prepared for the screw (fig. 1).

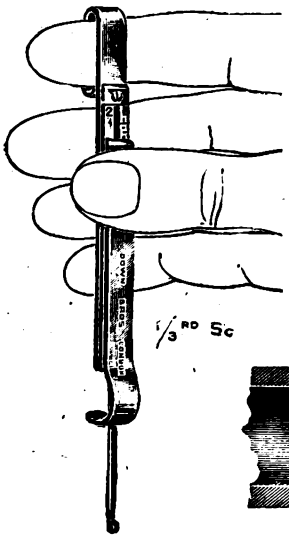

Fig. 1

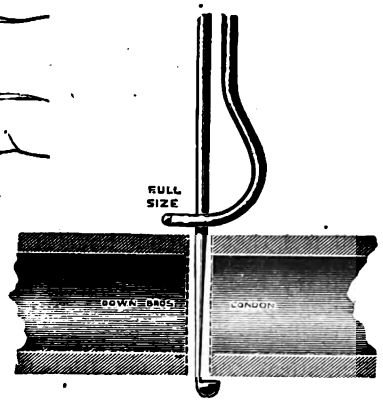

Fig. 2

The stilette is passed through the drill hole and the notch is made to engage on the distal surface of the bone (fig. 2). The sliding piece is then brought into contact with the graft

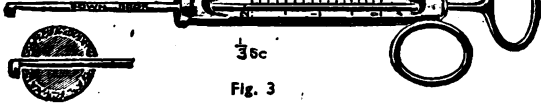

Fig. 3

or plate, held in the correct position by clamps. The depth of the drill hole can now be read off on the scale, and the correct length of screw chosen accordingly.

This instrument has proved simple and effective in practice. It has the advantage that no disturbance of the bone or soft tissues is necessary, as is the case with most of the other methods in use.

The makers are Messrs. Down Brothers, Ltd., of 22a, Cavendish Square, London, W.1, who have also made a simplified two-piece modification, easily dismantled for cleaning (fig. 3).

J. CRAWFORD ADAMS, MD LOND, FRCS
Squadron-Leader RAFVR

PUNCH FOR USE IN PLATING FRACTURES

IN the mechanics of bone surgery many problems arise which could be readily solved by mechanical engineers. In medicine we are slow to learn our lesson in these well-worn paths. The coöperation of Messrs. Down Bros. has enabled me to develop a simple instrument which I have seen used by engineers, and which will solve one small difficulty in plating fractures. The use of special stainless alloys renders it more than ever necessary that the drill holes in bone for the insertion of screws should be perfectly centred in the opening of the metal plates. If not so centred, drills may cut eccentric holes, thus not only damaging the edges of the metal plate but also giving the screw an imperfect hold upon the plate.

The instrument illustrated is a spring-loaded punch, sold to the engineering trade under the trade-name of 'Eclipse.' No hammer is needed for making the impression of the punch on the bone. Pressure on the handle releases a spring, the tension of which is adjustable; the point of the instrument then makes a small hollow in the bone against which the drill may be applied. This is modified by a further spring attached to the point, with a collar that fits into the bone-plate screw-hole and ensures that the point of the punch is centred accurately. A lengthening handle has also been attached, which enables the instrument to be used with less risk of the surgeon's hand coming in contact with the wound. When the fracture has been reduced and the metal plate is firmly applied and held in position, it is a matter of seconds to punch accurately six or eight drill points; with an electric power drill the most tedious part of the operation is then very quickly and efficiently performed.

I am indebted to Mr. H. Guy Drew, of Messrs. Down Bros., for his help.

NORMAN CAPENER, FRCS

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Reviews of Books

Beyond the Microscope

KENNETH M. SMITH, FRS, director of the plant virus research station at Cambridge University. (Pelican book. Pp. 110. 9*d*.)

Dr. Kenneth Smith is an authority on plant viruses and has made himself familiar with recent work on those attacking man and other animals. He has succeeded in writing a popular account of viruses which should be enjoyed by doctors as well as laymen. He has the journalist's eye for the dramatic—and the story of recent work on viruses abounds in drama. Thomas à Becket's lice, psittacosis in fulmar petrels in the Faeroes, vampire bats which carry rabies, the effect of cigarette smoking on diseases of tomatoes, the hidden reservoirs of jungle yellow fever, the relations between viruses and insects (and even earthworms), virus crystals—these are some of the excitements you can savour for a mere ninepence: the shilling shocker is nothing to it. With all this, Dr. Smith has his facts accurate, though he may occasionally be rash in trying to be too up to date. The recent claim from America that the influenza virus is only 15 millimicrons across has by no means been accepted by all workers; yet he quotes it as established fact. There is a chapter on viruses and tumours, and to finish with a fair summary of various modern views as to what viruses are.

Outlines of Industrial Medicine, Legislation and Hygiene

JAMES BURNET, MD EDIN., LL B LOND., FRCPE, lecturer on diseases of children, School of Medicine of the Royal Colleges, Edinburgh. (Wright. Pp. 87. 7*s*. 6*d*.)

Dr. Burnet insists that his book is an introduction and not a treatise. The legal sections cover briefly the Factories Act, with the history of factory legislation, the Workmen's Compensation Acts, and the Truck Acts. The whole book has what might be called a compensation bias, because even the sections on industrial diseases are built mainly on the schedule of compensable diseases, and they are therefore incomplete. The most original chapter deals with incapacity for work and could be studied with advantage by all who give medical certificates to factory workers. Some of the information given about industrial diseases is not up to date. For instance it was true 30 years ago that there was a "considerable amount of lead poisoning" among file cutters, but it is not true today when most files are cut by machine. Again, plumbers do not contract lead poisoning simply by handling lead pipes and sheet metal. In the section on scrotal epithelioma, reference is made to chimney-sweeps, but not to the more commonly affected mule-spinners. The book is well arranged and attractively printed.

Year Book of Obstetrics and Gynecology 1942

Editor: J. P. GREENHILL, MD, FACS, professor of obstetrics and gynecology, Loyola University. (Year Book Publishers; Lewis. Pp. 672. 19*s*.)

SINCE the death of Joseph B. De Lee the editorship of this useful and important book has been taken over by Professor Greenhill, who has maintained the standard of previous years. The format remains the same, the first part being devoted to obstetrics and the second to gynæcology. Epitomes of the year's papers are preceded by a brief memoir of De Lee. If the abstracts are a little less crystalline than they were, the editorial notes are as illuminating and balanced as when they came from the pen of De Lee himself—and this is no mean tribute to the present editor.

Tests for Colour Blindness

(9th ed.) SHINOBU ISHIHARA, professor of ophthalmology, Imperial University of Tokio. (Lewis. Plates 32. 50*s*.)

COLOUR blindness may be congenital; or it may be acquired, chiefly in association with conditions like tobacco blindness and optic atrophy. Of the congenitally colour blind the overwhelming majority are red-green blind only. The totally colour blind are easily distinguished, for they have nystagmus and defects of central vision as well. Dr. Ishihara's series of plates, first published in 1925, was devised as a quick and accurate method of detecting the congenitally red-green blind. It proved so successful that it was adopted by the Services and transport organisations as one of their standard tests, and has now passed through nine editions. It has now been reprinted in response to a demand from all three Services. The plates form such a delicate test that 10% of the male population are unable to answer them all correctly, and there is no doubt that the standard of colour vision required by them is higher than many branches of the Services desire. It is invaluable in weeding out all who have some colour vision defect, but it is often permissible to re-examine the failures on the Archer lamp or Edridge-Green lantern, when a number of the candidates will be found to have sufficiently good colour vision for the purpose in hand. Though this was not the first book of its kind on the market, it has proved the most successful, and Dr. Ishihara is to be congratulated on producing a quick test, easy to handle, in which the elements of luck and chance are absent.

Creatine and Creatinine Metabolism

HOWARD H. BEARD, PH D, professor and director of the department of biochemistry, Louisiana State University, New Orleans. (Chemical Publishing Co. Pp. 376. $4.)

Professor Beard has in his own words attempted to deal with the following topics: carbohydrate metabolism, muscular contraction, phosphate bond energy, phosphorylation and respiration, physical fitness, nutritional muscular dystrophy, the vitamins and hormones, and creatine-creatinine metabolism in the myopathies and diseases of the heart. Parts of his book are excellent. He has done a good deal of work on the metabolism of creatine and creatinine and the whole presentation has a pleasant personal flavour; yet no-one can accuse him of neglecting the efforts of other people, for he gives many data from other workers, a list of previous reviews, and some 900 references. His views on the ways in which radio-active nitrogen has been used (or abused) are much to the point, but there is some strange reading in the chapter on the "origin" of creatine and perhaps the section on the creatinine clearance was a mistake, since it may mislead those who do not know recent work on the measurement of glomerular filtration rate and the physiology of the kidney.

First Aid in the Royal Navy

(H.M. Stationery Office. Pp. 106. 2*s*.)

THE Navy have their own way of doing things and needless to say their methods are efficient. In many points this little book—which has been prepared for seamen in general and not only for medical or sick-bay personnel—differs from classical practice, and most of these differences might well be more widely known. For example, in the general rules for the treatment of unconsciousness, the patient is put in the prone position, so that the tongue cannot fall back into the throat. Useful hints are given on the treatment of fractures, and on transport of casualties. Most teachers, however, will feel that half an hour is too long to leave on a tourniquet. The direct style makes it intelligible to ordinary people and adds to its worth. Some of the photographic illustrations are below standard for a Government publication.

Statistical Tables for Biological, Agricultural and Medical Research

(2nd ed.) R. A. FISHER, SC D, FRS; FRANK YATES, SC D. (Oliver and Boyd. Pp. 98. 13*s*. 6*d*.)

IN this edition of a collection of tables which have proved their value to statisticians a few corrections have been made and some useful additions inserted. The latter include two tables for testing the significance of the difference between two means for which the errors are due to different causes, so that estimates of the variance cannot properly be pooled; a table for assigning the limits for the probability of an event; and one for estimating the number of organisms of a given type present in a medium by means of the dilution method, by which the presence or absence of the organism can be determined but in which counts cannot be made. Examples of the use of these and other tables are given clearly in the introduction and, as in the previous edition, the tables are beautifully spaced and printed.

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THE LANCET

LONDON: SATURDAY, OCTOBER 2, 1943

MEDICINE AND THE COMMUNITY

ADDRESSING the Representative Body of the British Medical Association last week, Mr. SOUTTAR, chairman of council, said that if the vast possibilities of postwar medicine are to be realised we shall need wisdom, patience and self-sacrifice. To these static properties he might have added others more dynamic —faith and hope. If motive force is the criterion, the Representative Meeting fell short of success. Its intentions and its conduct were estimable, but its members, for obvious reasons, were unduly tired and unduly grey, and their attitude was correspondingly negative. Their minds were not fixed on the possibilities of which Mr. SOUTTAR spoke—on the opportunity to make medical knowledge far more effective than it is today. Nor was there any sense of urgency: the prospect of a shortage of doctors was taken as a reason for postponing reorganisation rather than a reason for hastening it so as to make more economical use of medical resources. In their determination to be realistic the representatives seem to have lost touch with the larger realities—and with the public. Extension of National Health Insurance to dependants, with addition of specialist services, would have been accepted as a great advance five years ago. Today it fails to ring the bell. "The panel," with all its merits, has never inspired more than modified rapture, and nobody would now regard its limited extension as an instalment of the new social order on which so many have set their hearts. It is unrealistic to ignore the fact that war experiences, not only in the Forces but in every town and village, have bred a new feeling of equality, and that this feeling demands expression. Leaders of our profession accuse the Government of acting on "political expediency" when it seeks to introduce a comprehensive medical service available equally to all citizens. No doubt they are right; but governments, like anyone else, must attend to what is expedient. The Government presumably understands that by establishing such a service immediately after the war it would meet a deep emotional need. To put every man, woman and child in the country on exactly the same footing for essential medical care might be an act not only of political expediency but of high political wisdom. If that is so—and Parliament will decide—little importance attaches to the opinion of a professional body that inclusion of the whole community in the service is "unnecessary."

Against any disappointment should be set the choice as president of a man identified since 1920 with the cause of medical reform. Lord DAWSON'S speech, published on another page, fulfilled the presidential function to perfection. It brought to the meeting a breath of the outside world, a reminder of greater issues. Not for the first time, the speaker showed his awareness that our basic task in framing medical services is to find a mean between "community direction" and "individualism." To achieve a balance between them is indeed the ever-recurring task of all statesmen. Touching the variations of emphasis between Individual Absoluteness and Individual Relativity the philosopher A. N. WHITEHEAD wrote:—

> In one of their particularisations these ideas appear in the antagonism between notions of freedom and of social organisation. In another they appear in the relative importance to be ascribed to the welfare of the state and to the welfare of its individual members. The character of each epoch as to its social institutions, its jurisprudence, its notion of ideal ends within the range of practicability, depends largely upon those various patches of activity within which one or the other of these notions, individual absoluteness or individual relativity, is dominant for that epoch. . . . Frequently the shifting of emphasis is to be ascribed to the general tendency to revolt from the immediate past. . . More often changes in the social pattern of intellectual emphasis arise from a shift of power from one class or group of classes, to another class or group of classes. For example, an oligarchic aristocratic government and a democratic government may each tend to emphasise social organisation, that is to say, the relativity of individuals to the state. But governments mainly satisfying the trading and professional classes, whether nominally they be aristocratic, democratic, or absolute, emphasise personal freedom, that is to say, individual absoluteness.

Medicine must take account of an evident shift of emphasis, in our time, towards social organisation. The tendency may be desirable or undesirable; but it exists. The consequence for us must be restriction of individual practice in favour of coöperative practice, and it is inevitable that coördination should mean more control. When Dr. DAIN, chairman-elect of council, bids the BMA stand on the right to practise "where we like and how we like," he reveals sympathy with the past rather than the future.

Nevertheless the word "control" has an ugly sound for those who take pride in doing their best work for the sake of that work. Control, while improving the forms of medical service, might destroy its spirit; and in moving with the times we must contrive to keep the sense of personal responsibility that we have inherited. Personal responsibility to patients is vital to practice, and additions to the corporate responsibilities of the profession would enhance its value to the nation. To most of us, therefore, the idea of a National Health Corporation, in which doctors could play their part under a minimum of political control, is peculiarly attractive: for the profession it might offer an acceptable form of partnership between "the community" on the one hand and "individual effort" on the other. The Representative Body, impressed by the arguments of Dr. GRAY, decided that a corporate body shall now be the association's goal; and, if this does not exclude alternative interim solutions, we certainly shall not quarrel with their decision. A few months ago, however, we expressed doubt whether it will prove politically possible to entrust a comprehensive service to a corporation. We still have doubts, and it appeared that Professor PICKEN, spokesman of the BMA council, shares them. Like him, we are less concerned with a particular solution—an all-or-none policy—than with finding means by which a comprehensive service can be got going in the reasonably near future without sacrificing essential principles. Not quite all the principles now wedded by the BMA belong to this class.

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PATHOGENESIS OF JAUNDICE

A LONG step forward in the study of a pathological process is taken when the microscope demonstrates its successive stages and the various ways in which it may evolve. Such histological studies are seldom possible in the case of a rarely fatal process affecting an internal organ. Acute hepatitis is a case in point, but IVERSEN and ROHOLM showed that liver biopsy is a practicable [1] and informative [2] procedure. Their technique has been used and their observations extended by DIBLE, MCMICHAEL and SHERLOCK who report a first instalment of their own findings on an earlier page. It should be noted in passing that they do not recommend liver puncture as a routine procedure; it is not without risk of internal bleeding, especially in jaundiced patients. The basic findings were degeneration of liver cells coupled with infiltration of leucocytes and histiocytes. Cellular necrosis and autolysis was most marked in the centres of the lobules and seemed to spread outwards, whereas the infiltration was greatest in the portal tracts and spread inwards. In a mild case during the first week of jaundice, and generally in favourable cases, the periportal infiltration predominated, giving a "zonal" type of change. Severe cases presented early a "diffuse" type of change, with more pronounced cell necrosis and more widespread infiltration. There was no reason to regard these differences as fundamental, since an intermediate "mixed" type of lesion was also found. Four possible end-results of hepatitis are described. Recovery with complete restitution may follow even very severe lesions, for regeneration is assisted by the preservation of the reticulin framework of the liver in the diffuse type of change. The lesion may progress to a fatal issue with acute or subacute hepatic necrosis. When the disease is prolonged, fibrotic changes may give rise to a classical cirrhosis. Or a mild residual fibrosis may persist for some time after the zonal type of lesion, probably clearing up completely later.

Several points of interest arise from the biopsy findings. There was no evidence of bile stasis in the interlobular ducts, and it must be accepted that the pathological basis of epidemic jaundice is hepatitis and not biliary obstruction due to a plug of mucus in the papilla of Vater or an ascending cholangitis. This conclusion is also supported by the demonstration that liver inflammation has begun at the time of prodromal symptoms hitherto regarded as gastro-intestinal in origin. No histological differences were observed between cases of epidemic jaundice and those in which jaundice followed arsenotherapy or injections of human serum or plasma. This apparent histological identity does not, the authors state, imply that the same ætiological factor is concerned. The biopsy material illustrates how acute hepatitis may progress to acute or subacute liver atrophy or to cirrhosis, and that periportal "cirrhosis-like" infiltrations constitute one form of acute hepatitis.

These fundamental studies will interest especially those who are engaged in investigating hepatitis at the present time. CAMERON has reported [3] on work done by himself and others in Palestine. Clinical findings in cases of hepatitis among British troops were similar to those described in epidemic hepatitis elsewhere, as were the pathological findings in one biopsy and four fatal cases. In many of their cases the incubation period was prolonged and the onset was precipitated by a secondary factor, such as alcohol, intercurrent illness, chill, low diet or the fatigue of active service. Unsuccessful attempts were made to transmit infection by inoculating whole blood or leucocytes into monkey, dog, guineapig, mouse, rat or hamster. Suggestive results were obtained in human volunteers inoculated with one or two c.cm. of blood from cases of infective hepatitis. One volunteer developed a typical attack of hepatitis 30 days after inoculation, and five of the other six volunteers are known to have developed jaundice within 6 months. During this period there were other cases of hepatitis in the unit to which the volunteers were posted, so that, as the authors admit, the experiment was not conclusive. VOEGT [4] however claimed to have produced jaundice in human volunteers with injections of serum from cases of infective hepatitis, and CAMERON'S experiments strengthen the supposition that there is an icterogenic agent in the blood of early cases. VOEGT also had some success with duodenal juice which was drunk by volunteers, and FINDLAY and MARTIN [5] have induced jaundice in human volunteers by intranasal instillation of nasopharyngeal washings from men who had hepatitis after inoculation against yellow fever.

Evidence is thus accumulating that icterogenic agents are present in blood, nasopharyngeal washings and duodenal juice of cases of hepatitis. Only after their successful isolation will it be possible to fix the responsibility on particular agents for the hepatitis of epidemic, arsenotherapy and serum jaundice. In the meantime clinical, biochemical and epidemiological investigations may yield information that will aid diagnosis, treatment and control of the condition.

DISPOSAL OF REFUSE

THE evacuation of Watford Isolation Hospital necessitated by flies alleged to come from a nearby corporation dump may lead to litigation, but the hospital belongs to a joint board on which the town council is well represented, and the dump is the property of the corporation, so there seems no sense in loading the citizens with legal expenses. The law on the subject is clear—a corporate body has no more right than a private citizen to create a nuisance—so if the alleged offence is proved the board can obtain an injunction against the corporation. But if the corporation is compelled to abandon the dump it must find another way of dealing with its refuse. It may astonish the modern generation that the hospital was built next to the dump, or vice versa; but it was a common practice in the early days of fever hospitals to put them in out of the way corners away from respectable property, and pest-houses and pestiferous dumps were considered appropriate neighbours.

Household refuse collection and disposal in this country has never satisfied public health requirements, for tipping and incineration, the only common forms of disposal, are both objectionable. Paris and some other cities had methods of disposal which are profitable and harmless, but until the war we paid little attention to possible profit from refuse,

1. Iversen, P. and Roholm, K. *Acta med. scand.* 1939, **102**, 1.
2. Roholm, K. and Iversen, P. *Acta path. microbiol. scand.* 1939, **16**, 427.
3. Cameron, J. D. S. *Quart. J. Med.* 1943, **12**, 139.
4. Voegt, H. *Münch. med. Wsch.* 1942, **89**, 76.
5. Findlay, G. M. and Martin, N. H. *Lancet*, 1943, **1**, 678.

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and cheap and nasty methods were the rule. The war has shown how domestic rubbish can be collected and disposed of profitably without offence, and if war-time methods can be continued and extended in peace the problem will be solved. The dangers of refuse arise mainly from the decay of organic matter; if this can be separated from the rest and got rid of expeditiously, health will be satisfied. During the war there is comparatively little kitchen waste and that is used for feeding pigs and poultry. It is doubtful whether the conversion of offal into human food will continue after the war, and moreover we shall have a return of orange peel, banana skins and the like, of no value for animal feeding. Yet if organic waste is kept separate and dry it can be used as fuel and still be an asset. Health officers have tried hard and long to get people to burn their animal and vegetable refuse in their own grates, but with little success, and we must expect even less success in future if grates and stoves which burn raw fuel are superseded by gas and electric fires. In the country, householders can use their organic refuse as compost for their gardens, but this is impracticable in towns. Townspeople might agree to reserve one small bin for their putrefiable waste if such bins were part of the standard equipment of all houses. Collection would be neither difficult nor unpleasant and the material could be burnt in utility plants. The system of a specially designed sink, which was installed in some flats in Leeds, works well and is perhaps the best way of getting rid of refuse from flats in cities, but to be successful it must be used with intelligence. Outside large towns, tipping will no doubt continue for many years whatever is said against it; if trench tipping is adopted it can be made largely inoffensive, but this calls for much land and labour which small sanitary authorities are reluctant to supply. The dump is unsightly, harbours rats, forms a nucleus for fly-breeding, always stinks, and is often on fire. Yet it remains the favourite method of disposal.

An ideal system would be for householders to sort their rubbish, as they are supposed to do now, into papers, tins, ashes and organic matter, and for the last to be placed in small tightly-lidded tins which could be collected and removed without being opened, the full tins being replaced by empties at the time of removal. This would cost something in tins and suitable vehicles for their carriage, but all the refuse would be profitable and the net result to the householders would be not only the suppression of a cause of ill health but relief from a costly item on their rates.

Annotations

SALICYLATES AND HÆMORRHAGE

MANY years ago Binz noted that the large doses of salicylates given for the treatment of acute rheumatism sometimes caused hæmorrhages from mucous membranes. In 1926 Wetzel and Nourse[1] remarked that mucous membrane hæmorrhages were common in methyl salicylate poisoning. The liability of acetylsalicylic acid to produce gastric hæmorrhage[2] has been ascribed to the local irritant action of insufficiently disintegrated particles on the areas of gastric mucosa where they lodge. Honigsberger,[3] however, favours a general action; he has reported 3 cases of epistaxis after taking aspirin, and suggests that inquiries about aspirin treatment should be made in all cases of obscure bleeding. An explanation of the way salicylates produce hæmorrhage has now been put forward by K. P. Link and his colleagues as a result of their study of the action of 'Dicumarol.' Dicumarol does not affect the clotting of blood or plasma in vitro; given by mouth it induces a hypoprothrombinæmia after 24 hours or so and this latent period cannot be shortened by intravenous injection. The reasons for the delay are intriguing—dicumarol may inhibit prothrombin formation in the liver and time will then be needed for the prothrombin level in the blood to fall; dicumarol may qualitatively alter prothrombin; or dicumarol itself may undergo chemical changes. Huebner and Link[4] have now demonstrated that dicumarol can be qualitatively degraded to salicylic acid, and their study of substances structurally related to dicumarol has shown that the only ones having anticoagulant action are those that theoretically may yield salicylic acid or an *o*-hydroxybenzoic acid on degradation. The next step was to test the action of salicylic acid itself. Link and co-workers[5] found that when single doses of salicylic acid are given to rats kept on an artificial diet low in vitamin K, lowering of the prothrombin level in the blood follows; if vitamin K is present the hypoprothrombinæmia does not develop; if the salicylic acid is given over a long time hæmorrhages occur. Salicylic acid, like dicumarol, does not act in vitro. These observations on the hypoprothrombinæmic action of salicylic acid have been reproduced in man by Shapiro et al.[6] and Meyer and Howard[7]; they found that, as in the rat, simultaneous administration of vitamin K or a corresponding naphthaquinone will prevent the fall of prothrombin, although it is well known that vitamin K has little influence on dicumarol-produced hæmorrhages. An interesting point was that acetylsalicylic acid was found to be more effective than salicylic acid. There is thus good evidence that salicylic acid reduces the prothrombin in the blood, and this would satisfactorily account for the general hæmorrhagic incidents that have been noted. The gastroscopic evidence that local irritation is responsible for aspirin hæmatemesis is pretty convincing, but in view of Link's findings the prothrombin content of the blood should be estimated in cases of suspected salicylate hæmorrhage. Link's technique of estimating the prothrombin in 12·5% plasma should be followed, since in his extensive experience this technique showed the earliest changes best. There seem to be good grounds for giving vitamin K (6 mg. of 2-methyl-1 : 4-naphthaquinone daily was used by Meyer) prophylactically to patients having large and continued doses of salicylates. By analogy with the treatment of dicumarol hæmorrhage, the treatment of salicylate hæmorrhage should be transfusion of fresh blood; vitamin K is not likely to be effective. Here again we have a long-known clinical fact waiting many years for experiment to bring an explanation.

1. Wetzel, M. C., Nourse, J. D. *Arch. Path. & Lab. Med.* 1926, 1, 182.
2. Summarised in *Lancet*, July 10, 1943, p. 49.
3. Honigsberger, M. *Brit. med. J.* July 10, 1943, p. 57.
4. Huebner, C. F. and Link, K. P. *J. biol. Chem.* 1941, 138, 529.
5. *Ibid*, 1943, 147, 463.
6. Shapiro, S., Redish, M. H., Campbell, H. A. *Proc. Soc. exp. Biol.* 1943, 53, 251.
7. Meyer, O. O. and Howard, B. *Ibid*, p. 234.

ANOTHER YEAR'S SURVEY

THAT there is "no simple way of measuring the health (in a positive sense) of 40,000,000 people" makes it difficult, as the Minister of Health points out in his summary report[8] for 1942–43, to assess the effects of war on the fitness of the nation. It is true that in some respects we seem to be healthier than in peace-time; 1942, in fact was a year of record-breaking in vital statistics: maternal and infant mortality rates, the proportion of stillbirths and the standardised civilian

8. Report for the year 31.iii.43. HMSO, 1s.

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death-rates were all the lowest ever recorded in England and Wales, and the incidence of infectious diseases was also unusually low. Apart from tuberculosis and venereal disease, which remain black spots, there is no evidence of any increase in long-term illness, and surveys showed no deterioration in the nutritional state of the population. Comparison, of course, has to be made with statistics from the prewar years, and not with any ideal standard of what the health of the public might or should be. Moreover, the statistics available take no account of minor ailments, or sensations of fatigue and strain which nibble at the sense of well-being without bringing down the whole structure. Sample inquiries among doctors and rising claims for health benefit under NHI suggest an increase in short-term sickness such as might be expected after three years of war in which people have had to contend with long hours of work, with shopping, travelling and housing difficulties, civil defence and Home Guard duties, lack of holidays and the blackout. On the whole, Mr. Brown is able to assure us, at the end of 1942 the general health of the nation had been well maintained.

CARCINOMA OF THE PROSTATE

THE treatment of prostatic cancer has become a live subject for discussion since Huggins [1] reported from Chicago last year that castration affords remarkable relief even in the advanced stages. E. W. Riches of the Middlesex Hospital, in a discussion published in the *British Journal of Radiology* for July, says that the most successful form of treatment before the introduction of castration and stilbœstrol for this purpose was resection followed by radiotherapy; his experiences with radium have on the whole been unsatisfactory. Alexander Haddow, of the Chester Beatty Research Institute, urged caution before concluding that the new methods are really efficient, but the results reported by the clinicians seem extremely encouraging. Both castration and the use of stilbœstrol have emerged from the experimental stage and must now be considered the best treatment available. Even when there is not much change in the size or state of the prostate, pain from either the primary focus or the metastases is almost invariably relieved. The change in the patient's general condition—a rise in weight and improvement in vigour and feeling of well-being—is equally gratifying. The results are the same whether the patient has been treated by castration, œstrogens or both combined, and no ill effects have yet been reported.

NEW LIGHT ON BRONCHIAL ANATOMY

THE average anatomical textbook submits the trachea and main bronchi to precise scrutiny, but once the tubes and associated blood-vessels have entered the substance of the lung leaves their arrangement and destination in veiled obscurity. Pathological terms relating to lung disease—central or hilar pneumonia, upper or mid-zone infiltration—are no less vague. Physicians and surgeons engaged in chest work cannot afford to go on being hazy about the detailed anatomy of the bronchial tree, and our working knowledge of it, which owes much to the observations of Félix, Twining, Scott Pinchin and Morlock, and Nelson, has recently been amplified by Foster-Carter [2] and Brock.[3] A great deal of inaccuracy has probably resulted from reluctance to use lateral X-ray films in diagnosis. Owing to the obliquity of the main interlobar fissure it is impossible to say from an antero-posterior film whether a "mid-zone" lesion lies in the upper, lower or even middle lobe. Lung abscesses, limited areas of pneumonitis, growths, foreign bodies and collections of fluid or pus can only be exactly located by means of radiograms in two planes. These show that most of the localised pulmonary lesions occupy a segment of lung supplied by a more or less constant sublobar bronchus. The anatomy of these branches and the areas which they serve have now been studied by means of casts, gelatin injections, dissection, and radiographic analysis. Brock has confirmed that the main bronchus of the right upper lobe divides into apical, pectoral and posterolateral branches. Most accounts mention an important axillary tributary, but the area which this is supposed to supply is actually served by two components—an axillary branch from the pectoral and one from the posterolateral or subapical. A main axillary branch is seldom present. The subapical segment lies deep to the scapula and for this reason is clinically silent; it may not show up well in lateral radiograms, yet it is often the seat of disease. Tradition has also placed the posterior and upper limit of the interlobar tissues too high. The apex of the lower lobe rarely reaches higher than the 5th or 6th rib and the line of the fissure is placed lower and more horizontally than is generally depicted or described. The apex of the lower lobe (a common site for lung abscess and tuberculous cavitation) is supplied by the large first dorsal branch of the lower lobe; and the direction of this bronchus is directly backwards off the main stem. With the patient lying on his back secretions drain readily into it, which may explain why the area it supplies is often in trouble. That the position of the patient has an effect on the site of embolic infections has been recognised, and experimental evidence of it is advanced by Brock and others.[4] Posture and gravity share in both the ætiology and treatment of pulmonary infections, but they cannot be used effectively in therapy without full knowledge of the bronchial anatomy.

THE HEART AND THE GUT

WHEN heart disease simulates gastro-intestinal disease, or vice versa, the patient nearly always gets hold of the wrong end of the stick, and his doctor, unless he is wary, may find himself misled—possibly with fatal results. Of cardiac conditions masquerading under the guise of indigestion one of the commonest and most important is coronary disease either in the form of thrombosis, or of angina pectoris. In the case of angina pectoris it is when the pain is atypical in situation, occurring for instance elsewhere than substernally even being lower substernal in site, that most difficulty arises, especially when the pain occurs. A full and reliable history, especially of the relationship of the pain to exertion and rest, is the key to the diagnosis. Exercise immediately after a meal is much more liable to induce an attack than the same amount of exercise 1–2 hours later. The effect of nitrites is a helpful therapeutic test, particularly when negative; if amyl nitrite or tabellæ trinitrini do not relieve it, the pain is not that of angina pectoris. The pain of coronary thrombosis is more liable to radiate, even into the abdomen, and may be associated with nausea or even vomiting. Here again the history is important; hypertension may be a pointer, and serial electrocardiograms often settle the diagnosis.

Coronary thrombosis may confuse the picture in a patient who already has some abdominal lesion such as a peptic ulcer or carcinoma of the stomach. Congestive heart-failure, whether acute or chronic, seldom gives rise to difficulty, even when hepatic enlargement and tenderness or jaundice predominate: there are always some manifestations of heart-failure elsewhere, such as dyspnœa, congested cervical veins, or crepitations at the bases of the lungs. The symptoms of embolism, particularly when renal, splenic, or mesenteric, may be puzzling but are usually explained if careful search is made for the origin of the embolus. Hurxthal [5] suggests that all patients with mitral stenosis and auricular fibrilla-

1. Huggins, C. *Ann. Surg.* 1942, 115, 192. See *Lancet*, 1943, i, 177.
2. Foster-Carter, A. *Brit. J. Tuberc.* 1942, 36, 19. *Proc. roy. Soc. Med.* 1943, 36, 451.
3. Brock, R. C. *Guy's Hosp. Rep.* 1943, 91, 111.
4. *Ibid*, p. 131.
5. Hurxthal, L. M. *New Engl. J. Med.* 1943, 229, 148.

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tion should be advised, in the event of the onset of sudden severe abdominal pain, to remind or inform the doctor called in to them that they do suffer from this condition. A rare cause of difficulty in diagnosis is dissecting aneurysm of the abdominal aorta with pain usually radiating into the lower extremities. Aneurysm of the thoracic aorta and mitral stenosis occasionally cause dysphagia by pressure on the œsophagus, and so may dextra-aorta. Finally digitalis may cause nausea and vomiting, and some patients cannot tolerate even relatively small doses.

The picture is less complex when gastro-intestinal disease simulates cardiac disease. The Americans have emphasised that a case of diaphragmatic hernia may resemble heart disease, especially as regards the type of substernal pain. Such a hernia is easily missed except by careful radiological examination. In acute dilatation of the stomach the striking signs may be tachycardia, dyspnœa and cyanosis: Hurxthal's advice is not to forget the stomach-tube. Dyspnœa and angina pectoris may be due to anæmia resulting from unsuspected carcinoma of the colon, and an examination of the stools for occult blood is often the first pointer to the correct diagnosis. The association of gall-bladder disease and coronary disease is as classical as it is controversial, and it is only by reviewing all the evidence impartially that the doctor can avoid mistakes and protect his patients with coronary thrombosis from major abdominal operations.

CHEMOPROPHYLAXIS IN SCARLET FEVER

ROUTINE administration of sulphonamides in scarlet fever has not yielded clear-cut results, the drug seeming to exercise constant specific effect only in severe cases or in the presence of certain complications. Possibly this fact, and the mild character of the disease, have discouraged large-scale investigation of sulphonamides in the prevention of scarlet fever. The staff of a United States Naval Station[1] now report such an experiment undertaken on personnel numbering several thousands. These consisted of radio students in residence for 4 months and transients who stayed for periods of a few hours to several weeks, both groups being closely intermingled in dormitories and mess rooms. At a time when about 10 cases of scarlet fever (due to a group A, type 19 organism) were appearing weekly in both groups of men, the entire student population was given 0·5 g. of sulphadiazine twice daily, the transient group being untreated. A sharp decrease in scarlet fever incidence followed immediately among the students. The transient group was then stabilised as far as possible, and given 1 g. of sulphadiazine daily in a single dose. An even more striking decrease in incidence followed in this group. The drug was discontinued in both groups on Dec. 22, but no new cases of scarlet fever had appeared by Jan. 8. This was unexpected, particularly as a continuous survey showed a high and persistent type-19 carrier rate. Watson and his colleagues attribute the absence of scarlet fever at this time to dilution of carriers and susceptibles by intervening leave periods, but do not say whether the disease reappeared later. During the period of sulphadiazine prophylaxis a definite decrease in general respiratory illnesses was noted in both groups of men—a not unexpected result, in view of the hæmolytic streptococcal origin of many such illnesses. Reviewing the whole epidemic—the difficulties of maintaining adequate control in a shifting population, the absence of scarlet fever for at least 16 days after the drug was discontinued and the known vagaries of scarlet fever in epidemic form—it is difficult to feel certain that the outbreak was brought to an end by sulphadiazine. But the results fully justify further trial in circumstances favouring the rapid spread of a single-type infection in closed or semiclosed communities. That this may be done without risk when sulphadiazine is employed is evident from the trivial incidence of toxic reactions in this study. Gastro-intestinal disturbance, that bugbear of ambulant sulphonamide therapy, was not encountered.

1. Watson, R. F., Schwentker, F. F., Fetherston, J. E. and Rothbard, S. *J. Amer. med. Ass.* 1943, 122, 730.

PAIN IN THE RECTUM

Ryle[1] has recently described the distinctive qualities of the pain produced by different types of anal and rectal disease, and has analysed the parts played by mucosal inflammation and ulceration on the one hand, and by muscular spasm and distension on the other. He shows that rectal carcinoma, which may be regarded as the most serious of the rectal lesions, is often painless; whereas nervous proctalgia, seemingly due to tonic contraction of the strong muscular coat of the rectum, may be associated with agonising pain, without evidence of a local lesion. Normal and painful sensations in the rectum are probably always expressions of rectal muscle sense, whether of distension or of muscle spasm. The mucosa is insensitive. The anal mucosa, on the other hand, is extremely sensitive near the anocutaneous margin, and decreasingly so as it approaches its junction with the rectum. Ulceration of the rectal mucosa may therefore be quite painless, while an anal fissure, particularly during the act of defæcation, gives rise to exquisite pain, often referred to parts as distant as the thighs and buttocks. Ryle draws attention to the errors in diagnosis that arise from want of recognition of the widely referred pain in anal disease. The ulcer or fissure is tender to direct pressure, and can be fairly accurately localised by the patient. He does not mention that paralysis of the anal sphincter, whether by injection of a drug of the novocain type, or by stretching of the orifice under anæsthesia, can completely relieve the pain; thus anal spasm is obviously an important factor. Peri-anal hæmatoma (from thrombosis of an external pile) and peri-anal abscess cause a throbbing pain, aggravated by straining or coughing. The stripping up of the sensitive anocutaneous margin probably produces the pain. Ball-valve accumulations of hard fæces in the rectum cause a peculiar type of pain that has been specially studied by Ryle. The pain is of a bearing-down nature, and is rhythmically recurrent. The mass of fæces causes a partial obstruction that allows the passage of small ineffectual fluid motions, possibly mixed with blood. Bladder irritation may be present. Blood or barium make a stool of such consistence that it moulds into scybala which cannot easily be evacuated; a history of recent gastric hæmorrhage or of barium meal examination is suggestive. Rectal examination will confirm the diagnosis. In obstructive lesions of the rectum—for example, in growths at the pelvi-rectal junction—the pain is likely to be felt higher in the colon, owing to distension and the efforts of the muscle wall of the colon to overcome the obstruction. When pain is present in carcinoma of the rectum it probably indicates spread of the disease beyond the rectum. Ulceration invading the anal canal causes pain on defæcation. The rectal sensation is likely to be a sense of fullness and an urgency to empty the rectum, rather than one of pain. The most severe type of pain felt in the rectum is that described by Ryle as nervous proctalgia. He thinks it probable that the muscle-fibres involved in the spasm are those of the lower part of rectum and of the internal sphincter. If the recto-coccygeal muscle is affected there may be a feeling as if the coccyx is being bent forwards or backwards. The spasms of pain occur chiefly at night and last from 5 to 20 minutes. During the attack there may be an attempt at intussusception of the rectum. Injection of air or water through a Higginson's syringe may cut short the attack, presumably by distending the spasmodic muscle. The ætiology of this type of spasmodic contraction is obscure, but Ryle has found that it is often associated with fatigue, overwork and anxiety. The pain may be agonising.

1. Ryle, J. A. *Guy's Hosp. Rep.* 1943, 91, 147.

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Special Articles

BRITISH MEDICAL ASSOCIATION

FUTURE OF MEDICAL SERVICES

THE Representative Body met in London last week and debated the bases of medical reform. Dr. PETER MACDONALD presided.

Mr. H. S. SOUTTAR (chairman of council) said that the profession faces a crisis. The end of the war would also be the end of an epoch. The postwar future of medicine held vast possibilities, but their fruition demanded wisdom, patience, and not a little self-sacrifice. We must not grudge the effort nor allow the personal interests of the moment to blind our vision. The BMA had been active and the report of its Medical Planning Commission had preceded the Beveridge report. Indeed some of the Beveridge proposals were taken from the Commission's report. But when the Government set out to give effect to these proposals they assumed a very different complexion. "Our axiom that a first-class medical service should be obtainable by every individual, whatever his economic status, is expanded into the proposition that no-one is to pay for our services. Our desire to work together in groups is converted into regimented service under a local authority." Nevertheless the profession could not adopt a purely negative attitude; unless its policy was constructive it would fail. Accordingly the meeting was invited to consider certain general principles, and in so doing could lay the foundations of future medical practice in this country.

Points of View

Dr. J. D. R. MURRAY, for Exeter, asked the Representative Body to "view with grave apprehension the institution of a comprehensive health service provided as a right for the whole community. . . ." The Minister of Health's desire to secure a family doctor for the millions who have not got one could be met by extension of NHI to dependants. The remaining 10% of the community should not be included, for they clearly had no wish to belong to a glorified panel service. To which Dr. W. W. FOX replied that evidently NHI was considered good enough for the workers but not for the other 10%. Was it the duty of the profession to make distinctions or to provide the best service for all?

Dr. RAYMOND GREENE pointed out that a plan will be produced by somebody. If wise, doctors would bring forward a plan of their own, putting service to the nation first but also remembering that the best service can be given only by a profession which is able to work happily.

Dr. F. GRAY thought the decision whether everyone should be included in a national service should be left to Parliament. To object in advance might make the public—whose good will was needed—think that doctors have selfish financial reasons for wanting to exclude the best-off section of the community.

Dr. J. A. MOODY, for Stratford, advised postponement of discussion till the white-paper appears. The Government's proposals might appeal to a large section of the profession, and by tying itself in advance the BMA risked a repetition of 1911. But Mr. SOUTTAR urged that the strategy of war is to hold the initiative: instead of waiting for the Minister's terms the profession should state its own opinion and let the country follow its lead.

Dr. R. H. BALFOUR BARROW, for Winchester, wished the meeting to "oppose any fundamental change in the medical profession during the absence of so many members in the Services." Mr. SOUTTAR, however, believed that inactivity is not enough. "Do we want them to come back and find we've done nothing? No. We want them to come back and find a service so good as to be barely recognisable." Dr. GREENE thought there was something rather sinister about the way in which the men now serving are used as propaganda for a delaying action which might lead to plans being forced on the profession from outside. He had questioned many of the generation that have no practices to come back to, and found that at least 90% hope that the doctors left behind are going to prepare a decent profession for them to work in. Dr. BARROW said his resolution was suggested by Service members; but he did not carry it.

SALARIED STATE MEDICAL SERVICE

After these preliminary skirmishes Dr. J. B. JESSIMAN, for Worcester, proposed a motion condemning a whole-time salaried medical service. Attacking the Minister of Health, he described the project as a political expedient divorced from humanitarian principle.

Dr. W. V. HOWELLS claimed that radical change is needed in the present system, whose evils were evident in competitiom for patients, sale of practices, lack of time for diagnosis, and failure to take postgraduate courses, attend meetings or open journals. At last doctors were becoming vocal about these evils, and about their inability as "sickness experts" to affect the causes of ill health. The BMA should throw its weight into the struggle against disease. For this a comprehensive service was essential. It need not necessarily be a state service; but it must have a measure of coördinating direction, and this meant that it must be a salaried service.

Dr. G. H. STEELE argued that practitioners in a state service would not necessarily have more time for their work; and those who managed to get up against the Minister might be left with no means of earning a living. Dr. W. D. ANDERSON thought that after a period of evolution a full-time salaried state service might be the best this country could have; but its amenities, such as an 8-hour day, holidays, and postgraduate study, could not be realised while there was deficiency of personnel. Dr. C. M. STEVENSON said that the question at issue was not what is easier for the profession but what is best for the public. From that standpoint he believed the service should be comprehensive but neither salaried nor full-time.

The following resolution by Mr. J. ALLISON CORKEY, for Belfast, was passed by 200 votes to 10:—

That in the opinion of the Representative Body the creating of a whole-time salaried state medical service is not in the best interests of the community.

WHY THE HURRY?

As a reason for delay several speakers referred to the shortage of man-power. Sir KAYE LE FLEMING said that the service envisaged could be carried out only with a full complement of doctors. Even after the war many doctors would be retained in the Army for many years. To offer a comprehensive medical service in the near future when there was no possibility of providing it was a political gesture comparable to Jesse Collings's offer of 3 acres and a cow to every elector. The profession should make it clear to the public that it is ready and anxious to adopt reform on the lines of the Beveridge report, but that this is a long-term policy and there is no need for us to be hurried down the road. Everyone knew that the war has seen a great increase in pulmonary tuberculosis and that accommodation for the tuberculous is absolutely insufficient. What was the answer of the Ministry of Health? Preventive medicine and mass radiography! They were going to add to the crowd standing outside waiting for treatment but were doing nothing to provide the treatment.

Dr. J. A. BROWN said that general practitioners are getting a little tired of being asked to practise preventive medicine when prevention should be achieved by other means. They were asked to prevent tuberculosis while the sale of tuberculous milk is permitted; to encourage cleanliness when houses have no baths.

Dr. J. M. CAMPBELL declared that the profession resents being made the first object of reform—the Beveridge guineapig.

FUNCTIONS OF THE STATE

The City of London division tried to make the meeting say that the function of the state should be to provide a medical service which will give to its citizens the full benefits of modern medical progress. "Such a service," they declared, "will require a radical measure of reconstruction."

Dr. C. K. CULLEN maintained that no mere coördination of existing services, augmented where necessary, will give us the comprehensive service to which the Government is pledged. The Representative Body had allowed itself to be frightened by bogies—especially the bogy of change. All wanted freedom, but what sort of freedom? Freedom to do their work properly, freedom from

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isolation and the segregation of general practitioners from specialists, freedom from the anxieties of insufficient equipment, freedom from the nightmare of avoidable mistakes, freedom from the cramping restrictions under which work is done at present. These freedoms were not dreams but could be got in a measurable time if the profession is determined to have them. "Why talk about planning if we are to wait for evolution to work out the solution for us?" Dr. P. INWALD claimed that medical services should be as universally available as water-supplies. Like modern industry, modern medicine required planning.

Dr. J. B. MILLER, for the council, held that "radical measures of reconstruction" are opposed entirely to the BMA policy, which is one of evolution. The City resolution was lost by a large majority.

CONTROL OF DOCTORS

Dr. H. G. DAIN, for the council, said that the first idea of the Ministry of Health had been that young men coming into the new service must be whole-time and under the control of the service. Control of the profession was considered necessary because of the large sums that will be involved in certification. Doctors were willing to serve the public in the interests of patients. "But we can do this perfectly well as we do today without control by any other body. The fact that the state organises and pays for certain services for certain members of the community does not mean that the state should exercise any control over the doctors who do the work."

Dr. INWALD pointed out that—as regards notification of infectious disease, for example—the state already controls doctors rendering personal service. Dr. CULLEN said that as a tuberculosis officer working for a local authority he had never experienced any interference in the patient-doctor relationship. If there was to be control, let it not come from a remote office: he hoped for an extension of democracy in which control was exercised by people who came in contact with the doctor and would support him when attacked. When doctors as a body came under control they would have far more influence than as individuals.

Dr. R. W. COCKSHUT said the time had come when the small minority represented by the two previous speakers should cease their continuous attempt to change the views of the profession. They would never change them. They should give up trying and form a united front. Dr. INWALD replied that the Representative Body does not fully represent the substantial size of the minority in the profession.

Dr. O. C. CARTER and Mr. DONALD WATSON believed that whenever a Government assumes responsibility for a service it must exercise some form of control. Another speaker thought it would suffice to insist that there is no control of professional work for patients. But Dr. DAIN, who was amused at the idea that medical practice is today conducted in a state of anarchy, opposed control in any form. He objected to control of professional work; "but I want you," he said, "to be equally opposed to control of your personal freedom to practise where you like and how you like."

Dr. R. H. MOLE, for Oxford, wanted state control of doctors rendering individual or personal services to be limited "to ensuring the maintenance of a reasonable professional standard and a maximum of personal and professional responsibility." Control in some form was essential; it was useless to keep one's head in the clouds and pretend to be living in a world where there are no statutory limitations at all. What was important was to show the public that the doctor is and must remain primarily a free agent who has to act on his view of what is best at any particular moment.

Dr. P. PHILLIPS said that the legal responsibility always lies with the doctor. The attitude of his own municipal authority was: "We employ fully qualified medical men and if anything goes wrong the responsibility is theirs." He felt that control of any future medical service should be in the hands of doctors and not of lay civil servants and the like.

An amendment by Reigate opposed the setting up of "any central body, either medical or lay, to control the medical profession"; but Dr. DAIN remarked that such a body already exists in the GMC and that some day doctors might be very glad to have a medical body of this kind.

On one subject the meeting was united—namely, that future medical services shall not be controlled by local authorities as at present constituted.

A NATIONAL HEALTH CORPORATION

Prof. R. M. F. PICKEN, for the council, spoke of the need for "foundation changes" in central and local government agencies administering health services. At the centre half a dozen government departments shared responsibility; yet apparently the medical profession was alone in asking for the cleansing of this augean stable. Proposals for the improvement of local authorities, so far as they are known, were inadequate.

Dr. F. GRAY, for Wandsworth, said that two forms of central authority were possible. The first was a government department staffed by civil servants under a minister responsible to Parliament for every detail of its work. The aim of such a department must always be to avoid questions and make the appearance of things nice. The permanent head, the secretary, was appointed by the Prime Minister on the advice of the Treasury; and as prime ministers are busy men he was in effect appointed by the head of the Treasury. The attitude of the Treasury was negative and critical; it disliked the man who brings new ideas, new schemes, and requests for money. Civil servants hoping for high appointments behaved accordingly.

The alternative to a government department was a corporate body. This might consist of a board with half a dozen members appointed for a fixed term. The board was responsible to Parliament through a minister, but the latter was not answerable for the details of its work.

The profession, said Dr. Gray, wanted a comprehensive, coördinated and unified medical service. There was little chance that the various government departments at present concerned with medicine would surrender their functions to one of their own number, the Ministry of Health; but if a new corporate body were formed this difficulty would be removed. The profession wanted the new health service to be progressive; it must not stand still. But government departments were seldom anxious for new departures; they preferred to let things be. The profession wanted a long-term policy—not one policy one year and another the next. But government departments changed hands; the Post Office had had 11 postmaster-generals in 14 years. The profession did not want the medical services to be the sport of party politics—one party urging economy and another development. A board appointed for a fixed term would remove them from political control. Detailed parliamentary control was founded on distrust of civil servants; but if Parliament desired the best service it must trust the profession and not worry it about details.

Could it be said that the Ministry of Health had been out to secure the best medical service? It had concentrated on one thing only—to get the cheapest service. It had been subservient to the Treasury. Proposals for improvement had met the same reply—No more money. If the public realised this it would not for a moment consider handing over the new service to the Ministry of Health.

Dr. A. T. ROGERS thought it would be unwise to tie the hands of future negotiators by insisting on a corporate body. Its constitution presented serious difficulties and Parliament might not agree. Even with a corporation, Parliament could exercise day-to-day inquisition—as witness questions about BBC broadcasts. Equally satisfactory results might be obtainable from some other type of central authority.

Dr. RAYMOND GREENE said that things are bad, and it was the duty of Parliament to put them right. This could be done by putting them under one control. Should this be the Civil Service? No. The civil servant and the doctor were utterly opposed in training and outlook; where the doctor sought responsibility, the civil servant avoided and divided it. Control by small local authorities was beneath the dignity of a learned profession. The right solution was the setting up of regional councils comprising representatives of local authorities, local interests, and the medical profession.

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Over these regions should be a National Board of Health including government nominees, the presidents of the royal colleges, and the chairmen of a dozen consultative committees.

Prof. PICKEN, in reply, deemed it inadvisable to commit the association by declaring for a corporate body. He strongly sympathised with the proposal that public health and medical affairs should be managed by such a body "if it can be obtained." But there were corporations and corporations—in the last century the Poor-law Commission had earned the name of the Three Tyrants—and a corporate body might become unacceptable to the profession. If its institution meant that Parliament could not ask questions it would be bad for doctors as well as the public. A corporate body would not get away from Treasury control, since it must accept Treasury money. He suggested that the meeting should express merely a preference for this solution of the problem.

Dr. GRAY, on the other hand, urged the meeting to make its choice and then try to convince the country. This solution, and this alone, would give an efficient service. The meeting agreed with him and resolved that "the central administrative structure should be a corporate body . . . responsible for all civilian health services."

PRESERVATION OF PRIVATE PRACTICE

Dr. S. WAND said that if 100% of the community were included in the new medical service, private practice would be virtually abolished, and a state salaried service would follow. Supported by Mr. R. L. NEWELL, he proposed :—

That a comprehensive medical service should be available to all who need it, but it is unnecessary for the state to provide it for those who are willing and able to provide it for themselves.

Dr. ROGERS agreed that it is "unnecessary"—just as it is unnecessary for the state to provide elementary education, water-supplies and sewage disposal. At one time the richer sections of the community provided these things for themselves, but it had now been proved more satisfactory for the state to do so.

Mr. DONALD WATSON said that if 100% were included private practice would become impossible except at the whim of the Minister. Dr. C. F. TURNER believed that most medical services must serve the entire community: it was only for personal services there should be any question of less than 100% membership. Dr. CARTER, while agreeing that it would be easier for a Government scheme to comprise everybody, saw no advantage in thrusting it on a section of the public which in his experience definitely does not want it.

Dr. Wand's resolution was carried by 149 votes to 37.

Speaking on the right of patients in the service to consult privately any doctor inside or outside it, Dr. DAIN said that people entitled to medical care should have the confidence that comes from freedom to use it or not. It would be disastrous if the profession were split into two groups—official and unofficial doctors. Dr. GRAY remarked that if people cannot get a second opinion inside the service they will go to someone outside, and they might be driven to quacks. Dr. COCKSHUT also spoke of the perils of a black market in medicine.

Mr. A. LUCAS YOUNG pointed out that if a man paid a private fee to a doctor in the service his poorer neighbours would say: "This man is paying extra for something. For what? It must be something I'm not getting." He vigorously opposed the idea that people should be allowed to contract out of a 100% service if this was instituted. To permit it would incidentally allow administrators to argue that adequate remuneration of doctors within the service was unnecessary because they could still rely on private work.

Dr. P. A. MCCALLUM remarked that the public already divide the profession into panel doctors and other doctors, and Dr. H. H. D. SUTHERLAND said that this differentiation must disappear: all sections of the profession should regard themselves as equal.

EXTENSION OF NHI TO DEPENDANTS

In discussing the council's recommendation that, pending other reforms, National Health Insurance should be extended to include dependants and to cover specialist services, the meeting passed, without dissent, the following motion :—

There shall not be any extension of service under the National Health Insurance Acts until satisfactory terms and conditions, including an adequate capitation fee, have been agreed.

"We must show the Government, said Mr. Lucas Young, "that we're in flat disagreement with the present system on the present terms."

Derby argued that two-way extension of NHI would place 40 millions in the hands of the friendly societies, and might make it very difficult to get away later from the NHI system. Stratford said that if dependants of insured persons were distributed among panel practitioners before the men on service returned, the absentees would have a poor home-coming.

Dr. INWALD feared that extension to dependants might lead to NHI becoming the foundation of a future service. Dr. STEVENSON said that NHI needs much reform and the proposal to extend it was dangerous: it would be accepted by the public and profession as all that the BMA could offer at present, and reorganisation would be torpedoed. Dr. L. J. PICTON declared that panel practice, for all these years, has been carried by private practice. If by extending the panel service the profits of private practice were removed, the system would become unworkable. Various representatives felt sure that extension to dependants must mean more work, and Dr. HOWIE WOOD said it was physically impossible for doctors in his division to take on any new body of insured persons.

Dr. DAIN, for the council, explained that there is no intention of starting any new service, or increasing service, while the war lasts.

North Bedfordshire suggested that in extending NHI to dependants the income-limit should be £250. Doctors in some areas would be hard hit if it were £420. Dr. DAIN replied that though he would like to see the £250 limit re-established it would be a mistake to bind negotiators by naming a figure.

Dr. D. A. R. HADDON, for South East Scotland, urged that extension of benefits to dependants should not be undertaken through the agency of approved societies. Dr. T. CRAIG reported a strong feeling in Newcastle-on-Tyne that a time must come for abolishing the control of NHI by approved societies. Dr. PICTON thought it only fair to say that the societies are not hostile to the profession, and Dr. DAIN considered it unwise to amend the council's resolution as proposed. Maybe, he said, the approved societies would prove better friends than some supposed.

The council's recommendation for two-way extension of NHI was approved.

HEALTH CENTRES

Dr. COCKSHUT proposed :—

"That experiments in group practice, including health centres, should be carried out by a central authority and not by local authorities."

He need not, he said, emphasise the dangers arising from local authorities experimenting on their own. But Professor PICKEN persuaded the Representative Body to ignore them. Experiment, he said, must be multiform, not uniform.

Dr. R. W. RAE, for North Staffordshire, wanted a ruling that "efficient general practice is not dependent on the establishment of health centres." Dr. A. BEAUCHAMP said the public would interpret this as obstruction, and the meeting agreed with him.

CERTIFICATION

Dr. H. H. GOODMAN said that either mass unemployment or mass sickness would sabotage the Beveridge plan. As a referee of the Ministry of Labour he had formed an unfavourable impression of the state of medical certification, and on behalf of Newcastle-upon-Tyne he moved :—

That a National Medical Service which preserves the existing relationship of doctors and patients will demand of the doctors a high ethical standard on the matter of certification. One of the main causes of the present laxity is the intolerable increase in the number of certificates of every kind. Under a better organised service these should be much reduced and the profession should, at the same time, be

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prepared to accept any reasonable supervision of certification, as by the appointment of additional medical referees.

Dr. DAIN could not agree that there is "laxity" at present. The council fully realised the important place that certification will play in negotiations. If the profession was to remain free of control it would have to show itself capable of dealing with certification in a manner free from reproach.

Dr. GOODMAN did not accept suggestions that he should withdraw his motion, and it was lost.

MORE AND LARGER MEDICAL SCHOOLS

East Yorks carried a resolution :—

That the Representative Body, agreeing with the general principles of the Beveridge plan, strongly recommends that every effort be made to increase the number of qualified medical practitioners, and considers that to this end medical schools should be established at provincial university colleges where no facilities at present exist, but where the initial training could be given and ample clinical material is available.

Dame LOUISE MCILROY, supporting, said that in London hundreds of would-be medical students are turned down for the schools. Very difficult for men, admission was almost impossible for women, for only two schools would take them in any number. The country needed both new schools and combination of those existing.

When the motion was passed a speaker in the body of the hall invited the press to take special note of its first sentence, giving general approval to the Beveridge plan.

Principles Adopted

The recommendations of the Representative Committee (*Lancet*, August 14, p. 203) were approved by the Representative Body in the following amended form :—

(A) (To be embodied in a preamble recalling the principles set out in the *General Medical Service for the Nation*). 1. The system of medical service should be directed to the achievement of positive health and the prevention of disease no less than to the relief of sickness. 2. There should be available for every individual the services of a general practitioner or a family doctor of his own choice. 3. Consultants and specialists, laboratory services, and all necessary auxiliary services, together with institutional provision when required, should be available for the individual patient, normally through the agency of the family doctor. 4. The several parts of the complete medical service should be closely coördinated and developed by the application of a planned national health policy acceptable to the profession as a whole.

(B) The health of the people depends primarily upon the social and environmental conditions under which they live and work, upon security against fear and want, upon nutritional standards, upon educational facilities, and upon the facilities for exercise and leisure. The improvement and extension of measures to satisfy these needs should precede or accompany any future organisation of medical services.

(C) The efficiency of a country's medical services, both preventive and curative, depends upon the available medical and scientific knowledge, upon the character and extent of medical education, upon the sufficiency and quality of personnel, upon facilities for treatment and upon the absence of any economic barriers that impede the utilisation of such services. Thus, in order to improve the country's medical services, the facilities and resources for medical research should be greatly increased and methods devised for their adequate application; medical education, both undergraduate and postgraduate, should be maintained on a high standard and be adapted to modern needs; there should be sufficiency of personnel and institutional accommodation; and wherever economic barriers prevent an individual taking advantage of medical services such barriers should be removed.

(D) Subject to these general and overriding considerations, the functions of the state should be to coördinate existing provision, both official and non-official, to augment it where necessary, and to secure that it is available without economic barrier to all who need it. The state should confine itself within these wide limits, invading the personal freedom of both citizen and doctor only to the extent which the satisfaction of these functions demands.

(E) It is not in the public interest that the state should convert the medical profession into a salaried branch of central or local government service. The state should not assume control of doctors rendering individual or personal health service. The profession rejects any proposal for the control of the future medical service by local authorities as at present constituted.

(F) Free choice as between doctor and patient should be preserved as a basic principle of future health services, and no administrative structure should be approved which does not both permit and encourage such free choice.

(G) It is not in the public interest that the state should invade the doctor-patient relationship. The loyalty and obligation of a doctor rendering personal health service to an individual patient should be to that patient and to none other.

(H) Free choice of doctor should be reinforced by a method of remuneration which relates remuneration to the amount of work done or the number of persons for whom responsibility is accepted.

(I) Every member of the community should be free to consult the doctor of his choice either officially, as when he consults the doctor he has selected under an official service, or privately, as when he consults some other doctor, whether that doctor is a member of an official service or not. Nothing should be done to encourage the splitting of the medical profession into two groups—the official doctors and the non-official doctors.

(J) Consultants and specialists should normally be attached to the hospital. For those persons who wish to be treated in private accommodation, whether part of a hospital or not, private consulting practice should continue.

(K) The central administrative structure should be a corporate body concerned only with civilian health services and should be responsible for all civilian health services. This central administrative body should be advised on medical matters, including personnel, by a medical advisory committee representative of the medical profession which should be at liberty to publish its findings. Locally, new administrative bodies, responsible to the central authority, should cover wide areas and should be representative, directly or indirectly, of the community served and, in appropriate proportion, of the local medical profession and voluntary hospitals. They should be advised on medical matters, including personnel, by local medical advisory committees representative of the local medical profession which should be at liberty to publish their findings. These administrative changes should be regarded as foundation changes to be agreed before other changes are initiated.

(L) All branches of medical practice should be regarded as a single service, and it is undesirable that a detailed scheme for general practitioners should be framed and put into operation without corresponding arrangements for other branches of practice.

(M) Pending the consideration and completion of the foundation administrative changes mentioned in K above, as a step towards the satisfaction of Assumption B there should be extension of National Health Insurance to include dependants of insured persons and others of like economic status and to cover consultant and specialist services and laboratory and hospital facilities as well as general practitioner service. The service should be improved from time to time as recommended by the profession. Those persons with incomes above an agreed limit could, if Parliament decides to make the service available to every member of the community, be permitted to become voluntary contributors to the extended service. A reconstruction of insurance committees would be necessary.

(N) There should be initiated, by arrangement and agreement between the Government and the profession, organised experiments in the methods of practice, such as group practice, including health centres of different kinds which should extend to general practitioner hospital units attached to general hospitals. Future developments in group practice should depend upon the results of such clinical and administrative experimentation.

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OFFICERS OF THE BRITISH MEDICAL ASSOCIATION

The recent death of Sir Beckwith Whitehouse left the association without a president. On Sept. 21 Lord DAWSON OF PENN was elected to the presidency and at the annual meeting next day he made the speech printed on our opening page.

Dr. H. G. DAIN has been elected chairman of council, and Dr. PETER MACDONALD and Dr. J. B. MILLER have been re-elected chairman and vice-chairman of the Representative Body.

In England Now

A Running Commentary by Peripatetic Correspondents

AN airgraph provides a salutary lesson in self-discipline—it is an ingenious device for eliminating verbosity—so you won't be getting more than a brief paragraph about my doings with the CMF.

In my wanderings through North Africa and now in Sicily I am constantly coming across RMOs who were once in my class at the university. They usually hail me with something like this: "You probably won't remember me, Sir; you lectured to me in pharmacology in 1936. I still remember your questions in the oral examination. . . . Even now I don't know why Stockholm tar is called Stockholm tar . . ."; or, "Oh yes, sir, you plucked me in my materia in '37." This makes an unfortunate opening gambit when one is trying to lead up to some kind of congratulatory expression, having observed the MC ribbon out of the corner of one's eye. Still these youthful RMOs, rapidly maturing to self-confident and even staid practitioners under the influence of war-time experience, bear no rancour. They are obviously a little tickled by the sight of their former teacher clad in "shorts, khaki drill" and "shirt, bush" and welcome the opportunity to recall their experiences as students. Nicknames fall easily from their lips: Old Stockie, Bobby M, Sam C. and Noah are still vivid memories among medicos of the 1st Army and the Eighth.

* * *

If a group of hens are kept together they will soon establish an order of social precedence, what is called a peck-order. Any hen in the group will be entitled to peck any hen in a lower rank of the order without retaliation, but must herself suffer pecks from her social superiors. The order is established by such qualities as strength, aggressiveness, or bluff. Similar orders of dominance are seen in fish and lizards, as well as in mammals such as rats, cats, cows and men. The favoured individuals can secure a larger share of the available food, and, in the case of cock-birds, a larger share of or exclusive rights of access to the females. There is here a struggle in which the "fittest" have both the best chance of personal survival and of procreation. If, however, three separate groups of hens are compared, in two of which the group is allowed to establish its own order, while in the third the order is continually upset by changing round the individuals who compose it, it is found that the organised groups will eat more, keep up their weight better and spend less energy fighting among themselves. Here then we are dealing with advantages affecting future generations controlled by group qualities of organisation and coöperation in which individual differences do not affect the issue.

This experiment was performed by W. C. Allee and his colleagues of Chicago, and Allee has summarised the evidence for the existence of coöperative tendencies in many generations of animals (*Science*, June 11, 1943, p. 517). These tendencies would, he thinks, be favoured by natural selection and become biologically fixed. The usual view of the biologist, particularly of a past generation, is that the operation of natural selection can usefully be considered in terms of individuals and aggregates of individuals alone, without taking into account purely group qualities. The mathematics involved by this view have been worked out in great detail and have provided one of the major advances in biological thought in our time. But, with the exception of a rather cursory examination by J. B. S. Haldane, there has been no mathematical study of selective processes on genetic factors, which though of benefit to the group as a whole would bring some extra peril to the individual, as would for instance altruistic tendencies. There would here be a negative selection of the individual within the group, but a positive selection of the altruistic groups in which such individuals were of frequent occurrence. However that may be, Allee's view, that the coöperation and organisation involved in human civilisation are not of accidental growth but rest on fundamental biological tendencies, is compelling. He considers that scientific modes of thought may be applied to the solution of problems hitherto believed to be solely in the domain of religion. Animals, it is evident, not only struggle with each other for ascendancy, they coöperate. Human beings are driven by inherent tendencies to organise and build up communities as well as to fight and disrupt them. Every society of human beings we know of has exhibited these coöperative tendencies: we may assume them to be innate in the human animal. Goodness and mercy may be biologically as ingrained as hatred and aggression: nature red in tooth and claw, where only the strongest or cleverest survive, must be balanced by nature with its peck-order established and social ethics triumphant. It may be contended that there is a considerable gap between coöperation in a peck-ordered flock and kindness or altruism among the citizens, say, of Chicago, where Allee pursues his researches; and that science has hitherto been sensible enough to keep off ethics. The former objection is a strong one, only to be confuted by evidence (which is not yet, of course, available); the latter would be convincing if science never changed its habits, or if the habit in question were a fundamental method of science. It is true that science has refused to draw ethical conclusions or to be influenced, when drawing conclusions, by ethical considerations. Goodness and mercy are not subjects on which science has hitherto had anything to say (though scientists have been influenced by them when devising their investigations). At most these virtues have been studied as part of the subject matter of human psychology. But if Allee is right biology may show how far tendencies to be merciful and helpful are valuable in conducing to survival, not because they derive from a categorical imperative and have divine sanction but because they represent necessary inherited features in the members of highly organised and enduring animal communities.

There is nothing startling in such a suggestion. The kalonkagathon can be as properly the subject of scientific study and definition as can health or truth or other harmonies that give delight. The transition from "goodness" to "survival value" ("good behaviour is that which is valuable for survival") is a conceivable one, and proceeds less per saltum than that other inference from "indeterminacy" to "freewill," about which the physicists and the metaphysicians were lately busy. But before science can study goodness and other such "value-concepts" it must define them; and define them in terms which it can operate—no small task and one beset with such gins and snares as ignoratio elenchi, argument from analogy and other ambuscades of fallacy. If we can agree about some axioms, however—and even the most abstract mathematicians have to agree on some non-deducible axioms—there is no reason why we should not enter this new field of scientific inquiry, and be led to some useful conclusions.

* * *

It is strange how many of my middle-aged medical friends, in times of harassment, think of the day when they will be able to retire, and how many never attain that object, but carry on to the end. It is strange, too, how many are wedded to Nature, and want to dwell in peace in the country or within view of sea or loch; men whose days have been intimately bound up with all the amenities and drawbacks of town and city life. "A nice little cottage is all I want," one hears a tired man say, adding quickly, "with a little bit of garden, of course." I wonder how many of these dream cottages there are with latched gates, hollyhocks and the song of near-by blackbirds, where a man sees himself in the evening of life, sitting back enjoying that well-earned rest before the night bell rings to summon him to his final consultation. I hope there are many such; at least enough to spangle the hodden gray of professional worry wtih the colourful threads of sobered romance. For thinking about these things is as far as most of us will ever get.

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Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS M P

THE War situation has been transformed during the recess by the capitulation of Italy and in his two-hour-long statement to the House the Prime Minister covered both military and political aspects of war, and the crucial question how to root out Nazi and Fascist organisation in the countries of Europe. The debate which followed opened up a new vista of intense struggle on the field of battle and of immense problems on the field of the transition from war to peace. Mr. Ernest Bevin's survey of the man-power situation has underlined the "titanic struggle" he foresaw in 1944. It is in this perspective that other events and discussions on the floor of the House, in the Committee rooms and in the rooms of Ministers, must be considered.

The planning of a unified and comprehensive medical service, the improvement of urban housing and the provision of more cottages in rural areas are milestones on the way to the postwar world. But Mr. Ernest Brown is not likely to produce a white-paper on his medical proposals for about two months and definitive urban housing proposals may have to wait longer still. The immense demands of the Services for labour and material prevent any large-scale plan of repair and rehabilitation of urban houses unless the urgency is beyond dispute. The question which confronts the Ministry of Health will be to decide when this urgency is established. Recent increases in the amount allowed for repair of houses up to £200 per house are a concession, but not a solution of the difficulty. The overcrowding in London, Glasgow and other large cities is a grave problem and it is a matter for profound satisfaction that under these circumstances the report of the Ministry of Health just issued shows a good standard of health. That is apart from tuberculosis and venereal disease. The explanation may lie in the increase of income received by a large majority of weekly wage-earners over the 1938 levels, and particularly in an improvement in the food consumption of a large proportion of infants and school-children. Occupants of grossly overcrowded, bomb-damaged, damp and patchily repaired houses in city areas are nowadays supplied with larger quantities of milk, and other foods, and adequate clothing for adults and children.

The pay-as-you-earn scheme for weekly wage-earners is welcomed by all sides of the House as it is not only the removal of a serious grievance, but will help to relieve financial pressure, which was beginning to be a serious factor in health and morale. No date has yet been fixed for the beginning of the work of the pensions appeal tribunals. The delay has been caused by the decision of the Lord Chancellor, by whom appointments to the tribunals are made, that the work cannot begin until the new warrant is printed and available for all concerned. The revision of the warrant brought about by Parliamentary pressure before the recess is very far-reaching. The delay is not likely to be great and the tribunals should certainly be working in November.

A matter of which more will be heard in the House when it reassembles after a further recess—which many members on all sides of the House resented—is the famine in India. This is not confined to Bengal and is not to be explained as wholly due to hoarding. The solution is to regard the famine as an A1 priority and to allocate shipping to bring in wheat and other foodstuffs from the nearest convenient countries. The transport situation has been somewhat eased as the result of the Mediterranean victories and the victories of ship-building in British, Canadian, and especially USA yards, but it is not yet easy. Famine, however, and possible pestilence are not aspects of the war situation which can be postponed for future consideration. Civil security in India is one of the main foundations of the offensive against Japan.

Replying to a question, Mr. R. A. BUTLER said: The Minister of Food and I are proposing in the near future to conduct a census of the type of milk supplied to all schools in order to make provision for heat-treated or tuberculin-tested milk where this is practicable and desirable and where neither of these types is now supplied.

FROM THE PRESS GALLERY

Older Women for War Work

IN the debate in the House of Commons on Sept. 23 and 24 on man-power policy, the Government's proposal to call up women between the ages of forty-five and fifty was fully discussed. Mr. ERNEST BEVIN, the minister of labour, reminded his critics that in dealing with man-power the real battle for final victory had not yet begun. The Government would not be doing their duty if they either gave way to sentiment at this stage of the war or failed to take every precaution, whatever class of citizens might be affected. It was in that spirit, and he hoped impartially, that the Cabinet had faced this difficult, but important, turn of the screw, which would not have provoked a debate when danger loomed so large in 1940–41. Mr. Bevin claimed that the agitation over the calling up of the older women ought not to be attributed to the women. He was not impressed by the medical argument. He had registered nurses and midwives up to sixty and nobody made a single protest. There were 1,600,000 women between forty and sixty in employment at present, and of these 500,000 were between forty-six and fifty. No distinction must be drawn between women who had always gone to work and other classes. He would also have to direct boys of sixteen and seventeen to the aircraft industry. Mr. Bevin recognised that great care must be exercised in calling up the older women, and he promised that health difficulties would not be forgotten. The Government were gravely concerned about the effect of long bus queues on the health of the people, and they expected to be able to add to the number of vehicles available for public transport. To do this, several thousand bus conductors would be needed. There was also a special call for more nurses and midwives. He was hoping soon to get the report of the Hetherington Committee which would enable him to deal with the provision of more domestic help in hospitals. The registration of nurses and midwives brought in 400,000 persons. By the end of August nearly 3000 nurses had been placed in training or employment, and recruitment was continuing at the rate of about 300 a week, mainly among married women up to 60 years of age who were returning to their profession at this critical time.

Mr. CRAIK HENDERSON had had letters from dozens of doctors showing that the effect on women of the older ages of merely being called for registration, and perhaps having to go before appeal committees, would be serious. One of his medical correspondents said:

> "Besides, these women—very many suffer from nervous exhaustion, rheumatism, cardiac disorders, anæmia and insomnia—are physically unable to undertake any additional duties. Already they are harassed by shopping (long waiting in queues) and housework single handed; and many can hardly manage that efficiently. If additional burdens are forced upon them it will certainly not be long until health breaks down. As a result morale will be lowered in the family circle and resentment spread, with impairment to the war effort."

Another doctor said that there would be an enormous increase in factory accidents due to the attacks of vertigo to which women were prone at this age. But Miss M. LLOYD GEORGE had support from some women members of the House when she expressed the view that Mr. Bevin's proposal could be put into effect "without putting an intolerable burden on the women." Mrs. J. ADAMSON strongly resented the implication "that women of 45 are old doddering crocks that are incapable of doing anything for the country in its hour of need." Viscountess DAVIDSON thought that women up to fifty or even older were perfectly capable of doing any work if they had the time to do it in addition to their other responsibilities, but she pleaded that interviewers should realise the importance of not breaking up homes. Viscountess ASTOR felt that it was a pity to have to call these women up, and she appealed to the Minister to "go slow" in dealing with them. Sir HENRY MORRIS-JONES described the proposals as "a definite blot on the Minister's escutcheon and record." The Government had not made out a case for calling up the older women, in view of the present gross waste of personnel at younger ages. In the higher age categories of women, disturb-

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ances occurred which were inevitable owing to their age. There was a psychological factor involved which existed a million years before any minister of labour was known.

On the second day Dr. RUSSELL THOMAS regretted that the medical aspect of this matter had been put in the background. Great changes were occurring in the bodies of women in the age group forty-five to fifty which they did not get over in a day, and he suggested that older women and men might well be more suitable for work. Miss E. RATHBONE thought Dr. Thomas had overstated his case, but admitted that there was a difficult period in a woman's life, though it by no means necessarily coincided with the years of forty-five to fifty-one. The Minister would have done just as well however, from the medical point of view, if he had exempted women in that age-group and taken his registration from the ages of fifty-one to sixty, or even sixty-five. These later years were often the most healthy periods of a woman's life, because her constitution had then settled down. Therefore, she hoped that the Minister would not stop at fifty or fifty-one if he must continue his registration.

Mr. M. S. MCCORQUODALE, parliamentary secretary to the ministry of labour, gave a further assurance on behalf of the Government that physical fitness, which assumed special importance in connexion with these age-groups, would be treated sympathetically. If a doctor's certificate was not clear, or if any other circumstance presented doubt, it might be arranged that a woman should have an independent examination, but the normal practice in these age-groups would be to accept a medical certificate without hesitation.

QUESTION TIME

Medical Man-power

Sir ERNEST GRAHAM-LITTLE asked the Minister of Health what body was now responsible for the allocation of doctors for civilian services and the fighting services, respectively; what was the relationship between the Central Medical War Committee and the British Medical Association; and how far this committee was subordinate to the Shakespeare Committee in respect of the allocation of medical man-power.—Mr. E. BROWN replied: The Medical Personnel (Priority) Committee of which Sir Geoffrey Shakespeare is chairman, is responsible for advising, within the limits of any direction that may be given to it by the Government, on the number of doctors to be allocated to the civilian and fighting services and on matters incidental thereto. The Central Medical War Committee is related to the British Medical Association only to the extent that its secretariat and offices are provided by the association and that about two-thirds of its members are office-holders or nominees of the association. The Central Medical War Committee amongst other functions advises on the selection of individual doctors for allocation to the various services and is not subordinate to the Shakespeare Committee except in the sense that it must conform with the recommendations of the latter committee as adopted by the Government.

A Medical Officer's Widow's Pension

Mr. Q. HOGG asked the Secretary of State for War whether his attention had been drawn to the case of the late Mr. W. B. Highet, an orthopædic surgeon of great ability employed at the Wingfield-Morris Orthopædic Hospital, who volunteered for service in a special appointment in South Africa, carrying a major's rank, at the urgent request of certain military medical authorities, but was commissioned with the rank only of lieutenant and died by enemy action at sea before taking up his appointment; and whether he would so use his dispensing power under the warrant as to ensure his widow and child, now almost destitute, a pension comparable with his status in the profession and the work on which he was employed.—Sir JAMES GRIGG replied: A vacancy on an establishment is not regarded as filled until the occupant assumes duty. This officer was commissioned as a lieutenant and there is nothing to show that he was promised any other rank before he took up his appointment in South Africa. I sympathise with his wife and family and with the efforts made on their behalf.

Mr. HOGG gave notice that in view of the unsatisfactory nature of the reply he would take an opportunity to raise the matter again on the adjournment of the House.

Carbon-monoxide from Gas Producers

Wing-Commander N. J. HULBERT asked the Parliamentary Secretary to the Ministry of War Transport if he was aware of a number of cases of indisposition of conductresses and other personnel due to poisonous fumes from gas-producers towed by motor-omnibuses; to what extent this accounted for reluctance on the part of operators to use these plants; and if he was taking any steps to remedy this failing.—Mr. NOEL BAKER replied: My attention has been called to one case in which two conductresses were apparently affected by carbon-monoxide gas from a producer-gas unit attached to a public-service vehicle. The cause is being investigated, and the producer-gas unit concerned has been withdrawn from service. I am not aware that danger from carbon-monoxide is deterring any operator from using gas-producers. The danger is slight, particularly in the open air, but the attention of all public-service vehicle operators has been drawn to the matter to ensure that the necessary precautions are taken by them. The matter is also dealt with in the instruction book which will be distributed with each producer-gas unit allocated to goods-vehicle operators.

Hospital Accommodation in Scotland

The number of staffed beds in general hospitals in Scotland represents about 7·8 beds per 1000 of population. This figure excludes beds in sanatoria, mental and isolation hospitals and private institutions. Beds specifically reserved for tuberculous cases number about 1·2 per 1000 of population.

[Mr. J. WESTWOOD replying to Mr. W. H. MAINWARING.]

Vitamin Concentrates for Greece

Mr. D. M. FOOT, parliamentary secretary to the Ministry of Economic Warfare, informed Sir W. SMILES that monthly shipments of milk to Greece were increased in July from 300 metric tons of condensed milk to 600 tons. Shipments of vitamin concentrates since April had consisted of 1540 lb. of 'Betalin' tablets, containing vitamin B, 823 lb. of 'Cenalin' tablets containing vitamin C, 540,000 yeast tablets containing vitamin B and 1725 kg. of vitamin A and vitamin D. In addition, approval had been given for monthly shipments since April of 25 tons of cod-liver oil, and there had also been a single extra-ordinary shipment of 1484 lb. of concentrated fish-liver oil.

Infectious Disease in England and Wales

WEEK ENDED SEPT. 18

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 2639; whooping-cough, 1531; diphtheria, 723; paratyphoid, 8; typhoid, 7; measles (excluding rubella), 491; pneumonia (primary or influenzal), 365; puerperal pyrexia, 198; cerebrospinal fever, 44; poliomyelitis, 16; polio-encephalitis, 2; encephalitis lethargica, 2; dysentery, 268; ophthalmia neonatorum, 81. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Sept. 15 was 1774. During the previous week the following cases were admitted; scarlet fever, 240; diphtheria, 45; measles, 14; whooping-cough, 43.

Deaths.—In 126 great towns there were no deaths from measles or scarlet fever, 1 (0) from an enteric fever, 12 (1) from whooping-cough, 9 (0) from diphtheria, 68 (13) from diarrhœa and enteritis under two years, and 9 (0) from influenza. The figures in parentheses are those for London itself.

Bristol reported the fatal case of enteric fever. Liverpool had 6 deaths from diarrhœa. There were 3 fatal cases of whooping-cough at Manchester.

The number of stillbirths notified during the week was 197 (corresponding to a rate of 32 per thousand total births), including 28 in London.

Dr. M. M. WALKER has been appointed an assistant medical officer in the Colonial Medical Service at Jamaica.

A new series of Sunday evening health talks starts at 7 PM on Oct. 3, with the same title as the series which ran in the early summer: "Doctors Agree." "Health Magazine" at 10.45 AM on Oct. 1 contains a talk on the change of life by a woman doctor, and a talk on common health superstitions by a medical psychologist.

THERE will be a second showing of the film *Surgery in Chest Diseases* at the Curzon Cinema, on Monday, Oct. 11, at 5 PM. Applications for seats should be sent to the film department of the British Council, 3, Hanover Street, London, W.1.

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Letters to the Editor

CHRISTMAS AND THE RMBF

SIR,—It is my custom each autumn, through your columns, to invite my medical colleagues to take their part in the Christmas Gifts fund of the Royal Medical Benevolent Fund. This scheme, so generously supported by many, has become very remarkable; not only has it been the means of bringing to many old and lonely people a gift of friendship and sympathetic understanding at Christmas time, but it has also given many of your readers an insight into the great work which the Royal Medical Benevolent Fund is doing daily in helping medical brethren, or the widows and children of deceased medical practitioners, who are in financial difficulties.

We look upon the Christmas gift of £2 to each beneficiary as something "extra," but I must emphasise that the regular allowances have to be paid throughout the year. New annual subscribers are very urgently needed for our general funds, and surely it is for the present generation of practitioners to take up their share in a work which is a common professional inheritance and tradition.

It is not difficult to realise what happiness and comfort a Christmas gift of £2 brings to an old doctor, an aged widow or daughter living alone, possibly suffering from illness or infirmity. We ourselves know the difficulties and discomforts of our own lives caused by the present war. May I appeal, Sir, very earnestly on behalf of those who have suffered so much more than ourselves? I venture to make this letter a *twofold* appeal: (*a*) to all regular subscribers, to send their "extra" for the Christmas Gifts fund; (*b*) to all others, to show their practical sympathy by becoming subscribers to our general funds. I do not ask for large contributions.

Christmas gifts donations should be marked "Christmas Gifts," and all cheques made payable to the hon. treasurer, Royal Medical Benevolent Fund, 1, Balliol House, Manor Fields, London, S.W.15.

THOS. BARLOW,
President.

TUBERCULOSIS NURSING

SIR,—Dr. Houghton's letter in your issue of Sept. 4 was opportune. As things stand a nurse in training at a general hospital has little opportunity of learning how to nurse tuberculosis in any but its incurable stage, and yet we are making a supreme effort to find and treat patients before they reach such a stage. When she goes to a sanatorium as a nurse (or, if less fortunate, as a patient) she is astonished to find how much there is to learn in the management of thoracoplasty, artificial pneumothorax, Monaldi drainage, postural drainage, &c., as well as in the routine of ordinary sanatorium treatment. The position is entirely different from what it was 20 or even 10 years ago, and to meet these altered conditions the nurse needs a special training which cannot be acquired in a three-months visit to sanatorium or tuberculosis ward. If the segregation of fever cases and mental cases has created a need for state registration of those who specialise in their nursing, it is even more necessary for those who nurse tuberculosis, which still ranks high among fatal diseases. Dr. Ellman's arguments support rather than detract from the value of a register for improving the standard of tuberculosis nursing and the education of the nurse. Dr. Houghton's last paragraph reveals a serious defect in the existing system which should not be ignored for an utopian ideal.

Wokingham, Berks. WM. C. FOWLER.

NEUROSIS AND INTELLIGENCE

SIR,—Dr. Eysenck's article of Sept. 18 raises a point that is usually overlooked in such investigations and one which might help him to reconcile the difference between his results and those of Hollingworth and others.

Some 15 years ago, under the influence of J. S. Bolton's thesis (Brain in Health and Disease, London, 1914) that the chronic and recurrent insanities were evidence either of subevolution of the cerebrum on the one hand (the "amentias") or of dissolution on the other (the "dementias"), I did intelligence tests on a large number of certified patients of various types in the mental hospital. I was looking for psychological verification of this thesis and in view of Hollingworth's findings in psychoneurotics expected to have a fairly easy task. To my surprise the results were so erratic and irregular that I did not think them worth publishing. In the course of the investigation I realised one source of this irregularity. In order to obtain some standard of comparison I did the same tests (Binet, picture completion, Burt's reasoning test, Porteus) on an unselected sample of the nurses and attendants at the same hospital whom I took to be a comparable social and intellectual group. With these I found that the scores were very greatly influenced by age, being comparably much lower with the older persons. This effect was so great that it quite swamped the variation I was looking for. (Some of the results were quite startling—for instance, one charge attendant, a married man of just over forty with many years good service, had a mental age of less than 9 by Burt's reasoning test and barely 10 on the Binet scale.) The possible reasons for this great reduction of performance with advancing age are many (the naïve trusting outlook of children in these tests as contrasted with the varying attitude of adults unused to such "inquisitions" is one that shows up clearly), but whatever they are the effect must be allowed for in any investigation on adults. It could be avoided by studying the problem in children, where moreover the tests are more relevant. There must be plenty of material today in the numerous child-guidance clinics. Perhaps there one might get corroboration of my general impression, shared by most child psychiatrists, that true neurosis has little to do with intellectual level.

Leeds. HARRY EDELSTON.

SCIENTIFIC FREEDOM IN GOVERNMENT SERVICE

SIR,—Sir Edward Mellanby is not alone in thinking that the dominant factor in deciding health legislation has often a political rather than a scientific basis and that the great delay which often occurs before the results of scientific progress are adopted is sometimes due to administrative inertia or to lack of political or social interest.[1]

The Civil Service has many excellent qualities, but it would be an exaggeration to say that it is by tradition or organisation receptive to science or enthusiastic in the application of scientific teaching. Administrative reaction is influenced to a considerable extent by political expediency. Politics has been defined as "the art of the practicable," which means that expediency is bound to be the governing consideration and that wisdom may have to take second place to prudence. Compromise and science are unhappy bedfellows; and the administrator can always find many good reasons for doing nothing. The guiding principle is that nothing must be done or said or written that is likely to embarrass a Minister and, since any form of progress is likely to cause a certain amount of upheaval, science is apt to be regarded with suspicion. There are stringent Treasury regulations affecting the freedom of speech of civil servants and their liberty to publish without prior authority. A doctor working in the Civil Service is, in fact, effectively gagged; he can say or write only what has official approval. There is an administrative tendency, not confined to any particular Ministry, to regard the scientist as one whose job it is to provide his political chief with titbits with which to garnish a speech on the Estimates.

There may be good reasons for all this—it may even be an inescapable feature of democratic government—and presumably a doctor who becomes a Civil Servant does so with due recognition of what he is surrendering in return for his established position; but it is scarcely surprising that many have found themselves bewildered and shaken in an environment far removed from that of science, one in which a frank statement of ignorance on a specific point is often regarded as something little removed from official sin. It is difficult for a doctor in the service not to become isolated from his professional work and, consequently, a diminishing asset to the state. It is not easy to preserve a scientific outlook in such a setting, and it must be demoralising to find that the

1. Recent Advances in Medical Science, London, 1939.

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only certain way to further the development of a line of action scientifically desirable is to stimulate in the market-place an agitation in that direction which will in time make itself sufficiently insistent to provoke political activity—almost always a response to stimulation from the periphery. To be ahead of the times often spells political suicide.

The relationship of the doctor to state control is of particular importance at this time. Recently there has been an expressed determination not to become subject to the anonymity of Whitehall; but experience teaches that this may be very difficult to avoid. Sir Stafford Cripps believes that there is a need to increase the volume of research, both basic and applied, and at the same time to introduce some measure of planning so as to make the best use of available resources. He considers that we need a State Scientific Service apart from but on a parallel with the administrative Civil Service. Medicine must never allow itself to be put in a position which would involve the suppression of some scientific findings because they happen to be inconvenient or inconsistent with a Government policy, nor must it ever consent to become standardised and regularised along Civil Service lines. Any such development would be contrary to the interest of the profession and contrary to the interest of the public. It is not sufficient to secure airy Ministerial protestations of good intentions in matters so fundamental to the well-being and self-respect of the profession, and there must be effective guarantees that, whatever its administrative structure, the medicine of tomorrow will secure for its workers freedom of thought, freedom of expression, and freedom to practise medicine according to its lights. ARGUS.

HOSPITAL SAVING

SIR,—Something seems to have gone astray in the reasoning of your leader of Sept. 25. "If ordinary hospital saving schemes go on," it states, "the whole conception of a single all-embracing insurance contribution will have been lost." Why? "In a comprehensive service," it continues, "the only legitimate function of saving schemes is to supply extras." Can it be that the *Lancet* has fallen into the popular error about "hospital saving"? The legitimate function of saving schemes always has been to save the voluntary hospitals. Even if the payment made by the National Security Fund and the "hotel fee" meet the full cost of maintenance in the voluntary hospitals, there will still be need for men of good will to assist with the capital expenditure to save them from extinction and why should the *Lancet* want to stop them? It is unjust to a large proportion of the contributors to regard them merely as members of an insurance scheme. There is an enormous volume of voluntary work and keenness to maintain the voluntary spirit. Up and down the country there is evidence of it. The latest example in London was the gift made by contributors to the HSA to mark its twenty-first birthday—£12,000 raised spontaneously in a few weeks for scholarships for nurses.

Why should not the contributors have a free choice of hospital, and if contributing to a scheme facilitates admission to a voluntary hospital why should they not do so? Instead of securing "extras" it is as likely as not that the contributor may find some material respects in which he is at a disadvantage as compared with the patient in a municipal hospital. It may be just sentiment which stimulates him to want to go into a voluntary hospital, but he gives expression to it in a practical way, and sentiment is not without its healing balm.

London, S.E.24. C. E. A. BEDWELL.

VOICE OF MEDICAL SUPERINTENDENTS

SIR,—Most, if not all, of the suggestions made public for the future organisation of the health services of this country envisage some means for ventilating the views of the profession. Doubts, however, are felt over the machinery necessary to make the ventilation of those views efficient. That this is a matter of urgent importance is illustrated by the attitude of the British Medical Association itself and of prominent representatives. Thus, Professor Picken said at a recent conference that it was expected that medical officers of health would voice the opinions of municipal hospitals. Medical committees, boards, and so forth, are advocated, but there is a curious and significant omission of all reference to existing or future whole or part time officers of local authorities as such, apart from the medical officer of health. Medical superintendents have experience in public hospital administration, in infectious and in mental diseases shared by few others; is this experience not to be made available because they are whole-time officers?

ERNEST C. HADLEY,
Hon. Sec. Medical Superintendents Society.

Leicester.

MEDICAL AUXILIARIES

SIR,—The Council of the Board of Registration of Medical Auxiliaries of which we, the undersigned, constitute the medical members, would draw the attention of the medical profession to the objects for which the board was formed in 1936, and to ask for the full coöperation of the profession in the use of the register. Medical auxiliary work is taking an increasingly important part in the treatment of disease; yet, at present, it is open to anyone, qualified or not, to practise this type of work. The purpose of the board is to provide a register of qualified persons who are guaranteed to have undergone an adequate course of training, passed a recognised examination, and undertaken to maintain a good ethical professional standard. By consulting the register doctors or members of the public may assure themselves of the training and status of the person whom they employ for medical auxiliary work.

The board itself is a body composed of duly appointed medical practitioners and representatives of each recognised branch of medical auxiliary work. It has provided a standard register of the following groups: chartered masseurs/euses; radiographers; biophysical assistants; dispensing opticians; chiropodists; orthoptists and speech therapists—and can confidently recommend to the medical profession and the public those persons who are on its register. Support has been given us by many hospitals, public bodies and individual practitioners, but there is need for the whole medical profession to make use of the register if it is to serve to the full the purpose for which it was instituted.

Though at present, owing to the war, it is impossible to publish the register in full each year it is possible to supply any practitioner with information as to the qualifications of persons on the register. Inquiries should be addressed to the secretary of the board at BMA House, Tavistock Square, W.C.1.

V. ZACHARY COPE, President.
C. B. HEALD, Vice-President.
L. VERNON CARGILL, Treasurer.
L. D. BAILEY.
E. J. BOOME.
W. MCADAM ECCLES.
A. P. GIBBONS.
CHARLES LEONARD GIMBLETT.
NORMAN C. LAKE.
D. D. MALPAS.

Obituary

EDMUND CYRIL SMITH

M D DUBL, M R C P, D P H, D T M & H

THE death through enemy action of Dr. E. C. Smith, senior pathologist to the medical laboratory service in Nigeria, is announced. He qualified from Trinity College, Dublin, in 1921 when he was awarded the Bennett medal and a surgical travelling prize which enabled him to visit the medical school of Vienna. As pathologist at the Sir Patrick Dun's Hospital and the Mercer's Hospital he gained further experience in his specialty before taking his DTM & H in 1927 and joining the Colonial Medical Service. A colleague writes: There are few aspects of pathology in West Africa which Smith's work has not helped to illuminate while his *Atlas of Skin Diseases in the Tropics* and his *Introduction to Pathology and Bacteriology* for African students will long remain essential books for all who deal with illness south of the Sahara. Though official recognition lagged behind, Smith had earned an international reputation and hardly a medical officer of whatever nationality who found himself in Lagos failed to make the pilgrimage to the Medical Research Institute at Yaba. When war came Smith was anxious to join the Army but his work at Yaba was important not only for the health of the civilian population but for the Army Medical Services themselves.

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When these services were still in embryo his help with media, vaccines and above all his advice was invaluable; and he also organised most efficiently classes in tropical medicine for all newly arrived Army medical officers. Yet it is not only as a competent pathologist that Smith will be remembered, for he was one of the most generous as well as unassuming of men. He was perhaps at his best in his garden with his roses and flowering shrubs or in his bungalow surrounded by his dogs and books listening to the music he adored.

THE LATE SIR WILLIAM WHEELER

IN a brief memoir of Sir William Wheeler, which appeared in our last issue, it was stated that soon after his return from Ireland in 1932 he joined the surgical staff of the newly opened Southend General Hospital. Here, writes R. M., he brought to the problem of the hour a rich experience in hospital affairs gained in many parts of the world. There were few medical schools and clinics he had not visited, few leaders in surgery of his day that he had not met or known personally, and no surgical or administrative circumstance that he could not illustrate with anecdote—usually with a humorous twist. He was fond of recounting his experiences at the Mayo Clinic, and of the two famous brothers, Will and Charlie Mayo, of Lord Moynihan, J. B. Murphy, Sir Robert Jones, and other famous men, and of the great institutions in which they worked, and he enjoyed, after a long day in the operating room, sitting by the fireside in the residents' room surrounded by housemen and doctors, talking of surgery in general, of an interesting or puzzling case that was engrossing his mind at the time, of his adventures with subclavian aneurysms, huge intrathoracic goitres and recalcitrant ulcers of the stomach; of happy, lazy, care-free holidays spent fishing or walking in his native land, or of a devoted surgical sister who used to assist him with many of his operations.

A diagnostician before anything else, Wheeler was a strong advocate of the investigation of patients in hospital wards rather than in the outpatient department. He was horrified if his house surgeon admitted a patient one day for operation on the following day. He insisted that every case, emergencies of course excepted, should be completely overhauled whilst in hospital, and that such simple cases as inguinal hernia, interval appendix and hæmorrhoids needed at least seven days in bed with adequate preoperative study and treatment. For each one of his patients he felt a close personal responsibility and this led him to discuss the relative merits of small and large hospitals and to conclude that 400–450 was the ideal number of beds in one building if this close relationship was to be maintained.

Wheeler was deeply interested in the education of our nurses and frequently urged the need for more intensive clinical or bedside teaching. He encouraged all the nurses in his wards to go with him while he was doing his surgical rounds, which were always well attended by local doctors and distinguished visitors. He was at his best when called into consultation by his colleagues to give an opinion on a baffling case. Here his wide range of knowledge, his thoroughness in examination of the patient, his critical faculties and his quick grasp of all essentials proved of inestimable value to all concerned.

Dr. GEORGE HENRY PATTERSON, MOH for Ulverston for 56 years, died on Sept. 12 within a few days of his eighty-seventh birthday. He received his medical education at St. Bartholomew's Hospital, taking MRCS in 1879 and the DPH in 1896. He was in general practice in Dalton-in-Furness, when in 1886 he was appointed part-time MOH of Dalton urban sanitary district and twelve years later whole-time MOH of the Ulverston combined sanitary district.

On the eve of St. Luke's Day, Sunday, Oct. 17, at 8.40 PM, Sir Norman Birkett will appeal for medical missions in Africa as the week's good cause. Before the appeal, at 8 PM, Dr. Clement Chesterman, secretary of the British Advisory Board on Medical Missions, will conduct a religious service and speak on impressions and experiences of a medical missionary in Congo. Contributions to the appeal should be sent to Sir Norman Birkett, at 2, Eaton Gate, London, S.W.1, marked BBC Appeal.

Notes and News

CLINICAL PHOTOGRAPHY

AT a meeting of the Association for Scientific Photography on Sept. 18 at the Middlesex Hospital, Dr. H. MANDIWALL, enumerated the qualities required in clinical photography. They were, he thought: (*a*) a simple straightforward record with perfect definition; (*b*) a self-explanatory picture which did not include unessentials; (*c*) a well-presented print, as well mounted and finished as a studio portrait; (*d*) in colour photographs, the colour must be true to the original. Colour is of course particularly important in skin diseases. He suggested that a clinical group should be formed in the association, which would discuss the special aspects of photography, and compare technique. Photographers and manufacturers of apparatus might well collaborate, he felt. The requirements of clinical photography often differ from those of studio or outdoor work, and it would be an advantage to have apparatus designed for the work.

Mr. T. POMFRET KILNER, FRCS, thought standardisation in technique important, especially in his own sphere of plastic surgery. The photographs taken before and after treatment required to be strictly comparable as regards type of film, exposure and lighting. He illustrated his remarks with views of a simple equipment employing a Leica camera and photoflood lighting by which photographs could be taken at any angle and which could also be used for copying radiograms or documents.

Miss HILDA MARSDEN showed examples of the work done in clinical photography at the Christie Hospital, Manchester, using a half-plate camera with studio technique. She laid special stress on the importance of lighting, particularly in delineating the outline of growths.

In the discussion which followed, Mr. ANDREWS (LCC) showed illustrations of a convenient set-up for photographing patients in bed, made with the aid of a pair of steps of the sort available in any hospital. The camera was fitted to the top of the steps with the usual ball-and-socket joint and could be directed to the required position. By means of interchangeable lenses and lights (also fitted to the top of the steps at varying angles) he was able to take partial or full-length photographs of bed patients. He had found that a 4¾ in. lens was adequate for full-length and an 8 in. for head and shoulders. A 14 in. lens gives a close-up of any part of the body with the patient lying flat about 5 ft. below the camera. For interest, he showed a photograph of a patient with one brown eye and one blue, taken with orthochromatic film without a filter. Only one photoflood lamp was used and the colour rendering was very good.

Mr. HENNELL (Metal Box Co.) said that he had taken several thousand clinical photographs in colour during the war, using 'Sashalite' bulbs exclusively for illumination. He agreed with Mr. Kilner about the need for standardisation.

It was generally agreed that clinical photography should be undertaken by a professional photographer who would find it advantageous to make a special study of physiology and anatomy. A doctor or surgeon could not reasonably be expected to do his own routine photography. It was pointed out that most hospitals were equipped for X-ray work but not for clinical photography.

Those interested in the formation of a clinical photography section should write to the secretary of the association, Mr. R. M. Weston, at Houndwood, Farley, nr. Salisbury, Wilts.

NEW TB FILM

WITH the advent of mass miniature a new sound film called *Defeat Tuberculosis* has been made at the request of the Ministry of Health by the Ministry of Information. It is intended for exhibition to the general public, stresses the need for seeking treatment early, and illustrates modern methods of diagnosis and treatment of tuberculosis. It takes 10 minutes to run, but it cannot be shown on silent projectors. Local authorities and organisations can borrow copies, in sizes 16 mm. or 35 mm. sound, for showing to non-theatrical audiences, from the Central Film Library, Imperial Institute, South Kensington, S.W.7. In the South Western Region, the application should go to the Film Library of the South West, Dartington Hall, Totnes, S. Devon. Until the end of December the film is also being included in the programmes of the Ministry of Information's travelling projection units. Authorities wishing to arrange shows through these units should apply to the Ministry of Information film officer in their own region.

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IMPORTANCE OF HOSPITAL CONTRIBUTORY SCHEMES

UNDER this heading, in a 16-page booklet entitled "800 Years of Service" issued by the British Hospitals Association, appears the following paragraph:

They are a living testimony to the close co-operation between the hospitals and the general public. Over ten million working men and women are members of these schemes and have a direct personal interest in the hospitals which they support out of their wages and to which they know they can look for help in time of sickness and trouble. Although originally intended to link up a contributor with a particular hospital, it may happen that there is no vacant bed when required, or the need may arise when he is away from home. In such cases, he would be admitted either to a municipal hospital or to another voluntary hospital. Thus a contributor can obtain treatment whenever or wherever the necessity arises.

FOR THE MEDICAL LIBRARIAN

To us in England, with so many of our libraries either in ashes or in hiding, a full and instructive Handbook of Library Practice (American Library Association. Pp. 609. $5) comes like a voice, not untinged with irony, from another and happier world. The heading "Book selection and ordering" recalls Glendower's "I can call spirits from the vasty deep," and Hotspur's flippant reply "—but will they come when you do call for them?" The wealth of detail is perhaps rather overwhelming. It is, for instance, hardly necessary to tell the librarian that in "alphabetizing" (*pace* A. P. Herbert) the catalogue of periodicals the word "the" in a title may be disregarded; and the suggested cross-references "eye, see optics" and "optics, see eye" might surely have occurred to him unaided. But covering as it does every aspect of library management the book is valuable; and the chapters on rare books and reference works are especially worthy of mention.

University of Cambridge

Dr. A. L. Fawdry has been approved for the degree of MD in absence.

During July and August titles of the degrees of MB, B CHIR were conferred on J. Hardy, V. U. Lutwyche, E. M. Senior, and A. B. Willcock.

University of Leeds

The inaugural lecture of the faculty of medicine will be given by Sir John Graham Kerr, FRS, MP, emeritus professor of zoology in the University of Glasgow, on Wednesday, Oct. 20, at 3.30 PM. He will speak on medicine and education.

Royal College of Surgeons of England

Air-Commodore P. C. Livinston will deliver the Moynihan lecture at the college, Lincoln's Inn Fields, London, W.C.2, at 4 PM on Tuesday and Wednesday, Oct. 5 and 6. He will speak on visual problems of aerial warfare.

Two Imperial Cancer Research Fund lectures will be delivered at the college on Oct. 7 and 14, at 3.30 PM. Mr. H. G. Crabtree, AIC, will give the first, speaking on metabolic disturbances and the cancer problem, and Prof. W. E. Gye, FRS, the second on the problem of chemotherapy in cancer.

Pharmaceutical Society of Great Britain

The 101st session will be opened on Wednesday, Oct. 6, at 3 PM, at 17, Bloomsbury Square, London, W.C.1, when Mr. W. S. Howells, the president of the society, will deliver the inaugural address.

Society for the Study of Inebriety

On Tuesday, Oct. 5, at 4 PM, Dr. A. Ninian Bruce will deliver the nineteenth Norman Kerr lecture at Westminster Hospital medical school, Horseferry Road, London, S.W.1. His subject is to be alcohol and avitaminosis.

Faculty of Radiologists

The radiotherapy section will meet at 10 AM on Saturday, Oct. 16, at 32, Welbeck Street, London, W.1, when Dr. J. L. Livingstone, Mr. R. C. Brock, Dr. Ffrangcon Roberts and Dr. J. L. Dobbie will open a discussion on the treatment of carcinoma of the lung.

Westminster Hospital

On Monday, Oct. 4, at 3 PM, Mr. Ernest Brown will deliver the opening address of the new session at Westminster Hospital medical school. He will speak on the nation's health and the future.

Royal Society of Medicine

The section of pathology will meet on Tuesday, Oct. 5, at 4.30 PM. On Oct. 6, at 2.30 PM, Sir Walter Langdon-Brown will deliver his presidential address to the section of history of medicine. His subject is to be William Heberden and the age of reason, and it is one of a series of chapters in Cambridge medical history. On Oct 8, at 3.15 PM, at the clinical section Dr. J. D. Rolleston gives his presidential address. He will speak on the Clinical Society of London. At the section of ophthalmology on the same day at 5 PM there will be a discussion on burns of the eyelids and conjunctiva. The opening speakers are to be Wing-Commander J. C. Neely, Squadron-Leaders G. T. W. Cashell, Mr. T. Pomfret Kilner and Mr. Frederick Ridley.

Medical Honours

The following awards have been made in recognition of gallant and distinguished services in North Africa to the following RAMC officers:

O.B.E.—Colonel G. W. R. Bishop, MB BRIST.; Lieut.-Colonel J. H. J. Crosse, MRCS; Lieut.-Colonel P. T. L. Day, MRCS; Lieut.-Colonel A. S. Hollins, MB CAMB.; Lieut.-Colonel R. G. M. Keeling, MRCS; Major W. A. Law, FRCS; Lieut.-Colonel Malcolm MacEwan, MB GLASG.; Lieut.-Colonel J. J. O'Connell; Major H. W. Rodgers, MRCS; Colonel C. H. K. Smith, MB EDIN.; Lieut.-Colonel J. Trotter; Colonel W. E. Underwood, FRCS.

MBE.—Major A. R. Clarke, FRCS; Captain C. J. Cobbe, MB LOND.; Major W. C. Gledhill, FRCS.

MC.—Captain G. S. Hodge, MRCS; Captain G. D. Park, MB GLASG.; Captain David Wright, MB GLASG.

Medical Casualties

The following RAMC officers have been posted as prisoners of war: Colonel John Bennet, MD EDIN.; Captain J. A. Mark, MB BELF.; and Captain T. B. Smiley, MB BELF.

Prof. EDWARD HINDLE, SC D, FRS, regius professor of zoology at Glasgow University, has been appointed scientific director of the Zoological Society of London.

IMPERIAL CHEMICAL INDUSTRIES have given £5000 towards the University of Oxford's appeal for £250,000 with which to found a department of ophthalmic research.

Appointments

BECH, A. O., MB CAMB., MRCP: acting medical registrar at the Middlesex Hospital.

OWEN, C. G., MRCS: MOH for Stone rural district, Staffs.

ROBERTSON, FRANK, MD DURH.: first assistant in the department of medicine at King's College and the Royal Victoria Infirmary, Newcastle-on-Tyne.

RUSSELL, P. G., MRCS: examining factory surgeon for Llanwrtyd Wells, Brecon.

Births, Marriages and Deaths

BIRTHS

HALL.—On Sept. 20, at Birmingham, the wife of Major G. S. Hall, RAMC—a son.

ISAAC.—On Sept. 18, at Oxford, the wife of Surgeon Lieutenant P. W. Isaac, MBE, RNVR—a son.

LASS.—On Sept. 4, in London, the wife of A/Squadron-Leader R. W. Lass, MRCS—a son.

ROBERTSON.—On Sept. 21, at Bletchingley, Surrey, the wife of Squadron-Leader Douglas Robertson—a son.

MARRIAGES

BURGESS—LE ROUX.—On Aug. 4, Gerald Lynch Burgess, MRCS, squadron-leader RAF, to Susie le Roux, VAD.

CANE—MILLAR.—On April 6, at Dar-es-Salaam, Tanganyika Territory, Leonard Hugh Cane, MB, to Margaret Millar.

EVANS—JONES.—On Sept. 22, at Liverpool, David Trevor Howell Evans, FRCS, to Susan Jones.

SCOTT—PAYNE.—On Sept. 25, at Addiscombe, David L. Scott, MRCS, Flying-Officer, of Leyton, to Margaret Payne, of Eastbourne.

DEATHS

COLLETT.—On Sept. 21, Howard George Collett, LRCPE, aged 30.

EDINGTON.—On Sept. 24, in Glasgow, George Henry Edington, MD, D SC GLASG., FRCS, FRFPS, DL, consulting surgeon to the Western Infirmary, Glasgow.

MORGAN.—On Sept. 23, at Hove, George Morgan, FRCSE, aged 83.

TATHAM.—On Sept. 25, at West Byfleet, Ernest John Tatham, MD CAMB., late of Cheltenham, aged 82.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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ARTHRITIS IN POLIOMYELITIS

F. JOHN POYNTON, M D LOND, F R C P LOND
CONSULTING PHYSICIAN TO UNIVERSITY COLLEGE HOSPITAL, AND TO THE HOSPITAL FOR SICK CHILDREN, GREAT ORMOND STREET, LONDON

ARTHRITIC changes in poliomyelitis are of considerable practical and theoretical importance, and perhaps not as generally recognised as might be supposed. It is to Miss Maud Forrester-Brown, surgeon in charge of the Bath and Wessex Orthopædic Hospital, that I am indebted for the opportunity to study them and indeed for calling my attention to them, when acting as a war-time consultant to this hospital.

As far back as 1881 Barlow pointed out that acute swelling ordinarily in one joint of the paralysed limb might arise synchronously with, or appear after, the development of the paralysis; that this swelling might reach a considerable degree and yet there might be no redness or heat. Further, it might persist for weeks or months. In 1910 Coutts added examples he had seen affecting the carpo- and metacarpo-phalangeal joints and compared the condition to the Charcot joint. This was denied by a speaker in the same discussion because of the great destruction in Charcot's disease, but it must be allowed that in diseases affecting the nervous system arthritic lesions need not of necessity be equally destructive. Brief allusion to the arthritis in poliomyelitis is made in some English works on children's diseases and I have no doubt that in other countries this arthritis has been often recorded; for example in 1937 Lowman was fully alive to it. Not the least claim in this article is made either to priority or originality, for this arthritis has been clearly recognised over many years. Reference also here may be made to sweating, which is not general but local, affecting the hands and feet, and to the occasional observation of sympathetic nervous changes both of which have been described in poliomyelitis. At this hospital the nursing staff have been so impressed with this local sweating that they speak of "wet" and "dry" cases.

CLINICAL FEATURES

Apparently about October, 1942, a number of cases of poliomyelitis arose in the wide area which this Bath hospital covers. Some were extremely severe, damaging both limbs and trunk muscles; others were mild, and possibly there were some so mild as to elude immediate observation; some came to hospital in the earliest stages, others late. It was among this group that a number of cases of arthritis were observed and it would appear that it was unusually common, though perhaps experience is necessary to be assured upon this; if it was unusually common, it recalls the variation in the occurrence of rheumatic subcutaneous nodules in "juvenile rheumatism."

Many joints were affected in these cases: the ankles, knees, hip-joints, elbows and wrists. As Barlow pointed out there was no redness, but heat over the joint was noticed in some examples. This arthritis might occur, as he also noted, with the acute onset or come on considerably later when the patient was under careful treatment. It appeared before any treatment (not even when the local quack "snail soup") had been administered, or when the most careful postural and nursing precautions were taken. In some cases the joints remained stubbornly swollen for weeks and months and not all made a complete recovery but underwent a fibrous ankylosis, and an ankle of a badly paralysed limb instead of being, as one would expect, flail-like, was fixed.

The onset of the arthritis was painful and in some young children so painful that they behaved like infants with scurvy screaming at the suggestion of movement. The most puzzling examples were those in which a single hip-joint was affected. Fullness could be detected over the front of the joint, but pain and spasm of muscles are seen when there is no arthritis. In the more chronic cases the impression was given of a thickening of the capsules of such joints as the knee and ankle, rather than an excess of fluid in them. Early radiography showed little, but the first evidences were a distended capsule and a certain "fluffiness" of the inner surface of the synovial membrane. In the chronic, severe cases there were thickening of the capsule, diminution in the joint space, and some rarefaction of the bones. In no instance was there suppuration, and complete recovery was the rule. The sudden appearance of the arthritis in cases weeks after the acute attack caused little or no rise of temperature, and it was pain in the joint that gave the warning. Many years ago Barlow described what he termed "jump" cases of poliomyelitis, that is a renewed spread of paralysis after the first attack had died down. Such attacks are well recognised now, and the arthritis would seem to fall into line with these "jump" cases. As a general rule in this group of cases, the arthritis was more likely to develop in the cases of severe widespread paralysis than in the milder ones, but not always. Thus I was shown a little girl with only one lower limb not severely paralysed, whose right hip-joint was clearly swollen and extremely painful and the disease in the acute stage. It is easily understood how puzzling such cases must prove, and indeed it is always the unusual cases of a disease which cause confusion. Does the arthritis occur in an unparalysed limb? The answer is not easy to make, for it may be difficult, especially when there are scattered severe paralyses, to be absolutely sure that there may not be a slight paralysis in another limb. The answer however seems to be in the negative.

CAUSATION

In considering the cause of this arthritis various possibilities present themselves. Poliomyelitis is recognised as being caused by a virus infection, but many cases commence with a sore throat and fever, and the possibility of an accompanying second infection is a reasonable suggestion. In the cases here there was no satisfying evidence of such an infection, no sudden bouts of fever and no implication of organs such as the lungs and heart, no signs of suppuration or involvement of subcutaneous tissues, such as the nodules in "juvenile rheumatism," or enlarged lymphatic glands, as in tuberculosis. The late outbreaks of arthritis in a joint were in line with the "jump" paralysis described by Barlow.

Was this arthritis the direct result of the nervous destruction, including damage to the sympathetic system? Such a view recalls the suggestion of Coutts on Charcot's joints, and the arthritic changes in syringomyelia. The rare condition of intermittent hydarthrosis threw no light on the problem. No-one can doubt that profound nervous damage would cause a liability to a weakened resistance of such a structure as a joint to any kind of infection, but the cases at the hospital did not suggest a direct nervous cause, but rather its contribution to the likelihood of an arthritis. Is it the direct result of the virus infection aided by the nervous damage? This question raises that of whether other human virus diseases may develop arthritis and this has been recorded in mumps and dengue fever, so that poliomyelitis does not stand alone. The history of the arthritis resembles that of the poliomyelitis both in its appearance at the onset of the attack and the later exacerbations.

It is customary to classify poliomyelitis into groups, such as bulbar, cerebral, meningitic and so on, but it is of interest to recognise many general symptoms in the Bath cases. Some of the younger children would have outbursts of great irritability, even biting the nurses in such attacks; a number showed mental fatigue, and in rare cases there was an altered mental state which lasted for many months, eventually to recover. Such incidents were reminiscent of the much more severe conditions in encephalitis lethargica. Then there was the local sweating and moist hands that are often met with in chorea and rheumatoid arthritis. These various symptoms suggest a widespread poisoning by the virus in which the joints may be involved, possibly more often in one year than another. Some might suggest the arthritis is caused by lack of treatment, or by the use of plaster splints to keep paralysed limbs in correct position. The answer here is that it occurred in cases that had no treatment and in cases which had the most skilled treatment by rest and suitable adjustment. It hardly seems likely that plaster splints were responsible seeing that the vast majority so treated never showed signs of arthritis.

The most likely conclusion seems to be that the arthritis is a manifestation of the virus infection and an unusual phenomenon of the general disease.

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DIAGNOSIS AND TREATMENT

The practical importance of this arthritis in diagnosis seems clear. Writers on juvenile rheumatism include poliomyelitis as one of the pitfalls, and it is a setback to a doctor when he has called poliomyelitis *acute rheumatism* and later found a rapidly wasting limb. In my own experience it has been the pain which may occur in poliomyelitis that has been the reason for the mistake, and not the arthritis; but certainly the presence of a swollen joint would add to the likelihood of a mistake, particularly if the actual paralysis is not severe. Otherwise the rapid and scattered muscular wasting clinches the diagnosis. Extreme pain on movement is a feature of both diseases. There are other manifestations, cardiac in particular, which distinguish acute rheumatism, and the rapid rise of the sedimentation of the blood is very different to the slight change in poliomyelitis.

Tuberculous arthritis may be another pitfall and this particularly when the attack of paralysis is so slight as even to be overlooked and there is pain and swelling in a hip-joint. When this disappears and the child is found, owing to the slight paralysis of the affected limb, to limp, then tuberculous arthritis is likely to be suggested. Again it is found that while the blood sedimentation-rate alters little if at all in poliomyelitis, there is a sudden uprise at the commencement of a tuberculous arthritis. In addition the tuberculin tests are a warning, and if the paralyses are more spread and the muscular wasting more obvious the diagnosis of poliomyelitis will be the correct one. Very early X rays show no obvious difference in the two conditions, but later the destructive nature of tuberculous arthritis is apparent.

In some cases of *osteomyelitis* the joint is implicated, and again it is the unusual one of moderate but stubborn severity which may be puzzling. The altered sedimentation-rate, the absence of outstanding muscular paralyses and the picture in the X ray of the undermining of the cartilage of the joint are helpful, as also the absence of any outbreak of poliomyelitis in the district. Above all is the damage to the shaft of the limb.

Meningococcal arthritis is well known, and in a recent paper on cerebrospinal meningitis Copeman and Stewart (1942) suggested that the *Diplococcus rheumaticus* described by Paine and myself was in reality probably two different micrococci, one being the meningococcus the other the *Diplococcus rheumaticus*, and they also commented upon the nervous and muscular lesions in rheumatoid arthritis. The results of examination of the cerebrospinal fluid differ from those of poliomyelitis but these observations remind us of the complexities of the problems in human diseases, the more so when we recall encephalitis lethargica and the work of Schlesinger and his colleagues (1935), and Eagles and his colleagues (1937) on the virus theory of the origin of acute rheumatism.

The *treatment* resolves itself into keeping the affected joint at complete rest when the pain is thereby relieved. Occasionally a much swollen joint such as the ankle is assisted by careful strapping to add some gentle pressure. We are perhaps inclined sometimes, having thought that poliomyelitis is essentially a disorder of motor elements of the nervous system, to think the pain is not altogether real, but the occurrence of this arthritis warns us to be extremely careful in moving the child about for any active treatment lest we cause considerable distress.

CONCLUSION

The object of this paper is to point out that at least in some outbreaks of poliomyelitis, arthritis is comparatively common and this may not be generally recognised. This disease of virus origin and so destructive to the nervous system may possibly in the future help to throw light on rheumatoid arthritis and the nervous lesions in acute rheumatism, and is certainly of great interest and stimulating to our thoughts on many different diseases in which nervous lesions and arthritis may occur.

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STREPTOCOCCAL MENINGITIS TREATED WITH PENICILLIN

MEASUREMENT OF BACTERIOSTATIC POWER OF BLOOD AND CEREBROSPINAL FLUID

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THIS case was one of those recently reported by Florey and Florey.[1] It was then included (case 12) in a series with many others and therefore the notes had to be severely abridged. The case was the first in which intrathecal injection of penicillin was used, and the first in which the bacteriostatic power of the blood and spinal fluid was systematically titrated throughout the treatment, so that it seems worthy of a more complete record. More especially it seems important that the methods used for testing the bacteriostatic power of the blood and cerebrospinal fluid should be described, for there is as yet no chemical test for penicillin in blood as there is for the sulphonamides, and the only way of estimating the penicillin content of the blood is by bacteriostatic tests. More patients are now being treated with penicillin both here and in America, and it is very desirable that estimations of the bacteriostatic power of blood, &c. should be made so that the dosage of the drug can be scientifically controlled.

It may be that a favourable result in this case could have been obtained by intrathecal treatment only, but at that time penicillin had not been used in this manner, and there was no knowledge as to how it would be tolerated or for how long it would remain active in the spinal fluid. The observations made on this case have enabled other cases of meningitis to be treated successfully by local treatment with an enormous saving of penicillin—an important thing in these days of scarcity.

CLINICAL NOTES

Male, aged 52. Fever began June 18, 1942. No localising signs. Admitted to St. Mary's Hospital on July 7. Temp. 100·2° F. No satisfactory diagnosis could be made.

July 14. Developed signs indicating meningitis. Drowsy and wandering with slight neck-rigidity. Lumbar puncture performed: pressure 300 mm.; CSF 500 cells per c.mm. (mostly polynuclears); globulin and total protein increased; the fluid was unfortunately not examined bacteriologically until next morning, and any infection was obscured by the presence of large numbers of non-pathogenic gram-negative bacilli. Sulphapyridine (1 g. 4-hourly) was administered. Temperature became normal in 12 hours and remained normal during the course lasting 8 days. The patient, however, remained wandering and drowsy throughout.

18th. CSF was clear. Still some polynuclear cells. No organisms discovered.

21st. Sulphapyridine stopped, and on the next day temperature rose to 100° F.; pulse-rate 100 per min.; sick, wandering. Definite head-retraction. Kernig sign positive.

24th. 24 c.cm. of CSF removed: pressure 300 mm.; turbid; cells all polynuclears; no organisms seen or cultivated. At this time the patient was drowsy with occasional fits of extreme restlessness. There had been incontinence of fæces at intervals. A persistent hiccough developed which could not be controlled and the patient was obviously going downhill. Sulphathiazole was administered from July 24 to Aug. 6 without improving the patient's condition.

Aug. 1. Lumbar puncture: CSF turbid with polynuclear cells; cultures of centrifuged deposit showed no colonies, but 3 c.cm. of fluid shaken in 10 c.cm. of "sloppy" glucose agar (0·2%) gave 20 colonies of a non-hæmolytic streptococcus.

4th. Lumbar puncture: fluid as before. By the same method ("sloppy" glucose agar) 6 colonies per c.cm. of the same streptococcus were cultivated, although no growth could be seen on a blood-agar plate inoculated with the centrifuged deposit of 4 c.cm. of the CSF. On subculture from the glucose agar the streptococcus showed the following growth characteristics:

Blood agar.—Small flat regular colonies not altering the medium.

Boiled blood agar.—Very small colonies. Where the

1. Florey, M. E. and Florey, H. W. *Lancet*, 1943, i, 887.

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colonies were dense there was a slight greenish discoloration.

Agar.—Minute, transparent, round colonies.

Broth.—Faint, even turbidity.

Glucose broth.—Very dense even turbidity.

The cocci from broth and glucose broth cultures formed chains of up to 20 elements. The coccus was planted on blood agar containing gutters of sulphathiazole (1 in 5000) and penicillin (crude culture fluid). There was no inhibition of growth by sulphathiazole, but no growth occurred within 11 mm. of the penicillin, showing the organism to be resistant to sulphathiazole but sensitive to penicillin. The glucose broth culture was very acid, but when the pH was adjusted to 7 the culture formed a stable suspension suitable for agglutination tests. With the patient's serum agglutination was complete in a dilution of 1 in 80, and incomplete up to a dilution of 1 in 320, but none of the 12 normal serums tested gave any agglutination in dilutions of 1 in 10 or more. This confirmed the diagnosis that the streptococcus isolated on these two successive occasions was the infecting organism.

Aug. 5. Skull X-rayed for cerebral abscess with negative results.

Condition at the beginning of penicillin treatment.—On Aug. 6 we got in touch with Professor Florey who furnished a supply of penicillin for treatment. The patient was in a very bad state and appeared to be dying. He took little food; had been for days drowsy with occasional bouts of extreme restlessness; now drowsy, comatose, wandering and rambling; had been suffering from uncontrollable hiccough for 10 days; had been incontinent for a week, and on the night of Aug. 5/6 had to be stimulated with oxygen and coramine. On the evening of Aug. 6, two-hourly intramuscular injections of penicillin were begun. In 24 hours the patient was mentally clearer, the hiccough had disappeared and head-retraction was less marked. Temperature had fallen to 97° F.

Aug. 9. Sudden rise of temperature to 102° F. Drowsy. No sickness.

10th. Temperature again normal. Mentally more rational.

11th. Sudden rigor in morning (temp. 102° F.). Lumbar puncture: pressure 300 mm.; CSF turbid with polynuclear cells; no organisms.

12th. Temperature again normal. Lumbar puncture: 20 c.cm. CSF withdrawn and intrathecal injection of 5000 units of penicillin in 20 c.cm. of water given.

13th. Temperature 100·5° F. Mentally much more alert. Lumbar puncture: fluid withdrawn and intrathecal injection of penicillin repeated.

14th. Temperature normal. Lumbar puncture: fluid withdrawn and intrathecal injection of 2500 units of penicillin in 10 c.cm. of patient's serum given (with the object of providing opsonic substances which were lacking in the cerebrospinal fluid).

15th. Temperature normal. Lumbar puncture: fluid withdrawn and intrathecal injection of 5000 units of penicillin in 20 c.cm. of water given. Patient enormously improved but complaining of tiredness through lack of sleep, as he had had 2-hourly intramuscular injections since Aug. 6. Intramuscular injections discontinued from 8 PM to 8 AM.

16th–18th. Very alert and condition excellent. Intramuscular injections during the day only and discontinued on Aug. 18.

19th. Lumbar puncture: final intrathecal injection of 5000 units of penicillin in 20 c.cm. of water.

28th. Temperature has been normal for two weeks. Patient getting up. No sign of meningitis.

Sept. 9. Left hospital apparently well.

Sept. 24, 1943 (13 months afterwards). Patient has remained well. Recovery complete.

The dosage of penicillin, in thousands of units, was as follows:

Date: Aug.	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Intramuscular	30	120	120	190	240	180	160	105	90	100	90	90	90	
Intrathecal ..	..	..	..	..	..	..	5	5	2·5	5	..	..	..	5

Total: intramuscular, 1,605,000; intrathecal, 22,500 = 1,627,500 units.

BACTERIOSTATIC POWER OF BLOOD-SERUM

As it was undesirable to withdraw large amounts of blood daily from a very sick patient micro-methods were used. Staphylococci sparsely planted in human serum in capillary chambers such as slide cells or tubes grow out not as a diffuse growth but in well-defined colonies which can be easily recognised and counted. This happens not only when undiluted serum is used but also in dilutions of serum in normal saline up to over 1 in 100. Estimations of the bacteriostatic power of serum can therefore be made in serum diluted in saline, but it is more convenient to make the dilutions in a fluid which will by itself show the typical staphylococcal colonies, and such a fluid which is readily obtainable is human serum diluted 10 times in saline. This has the

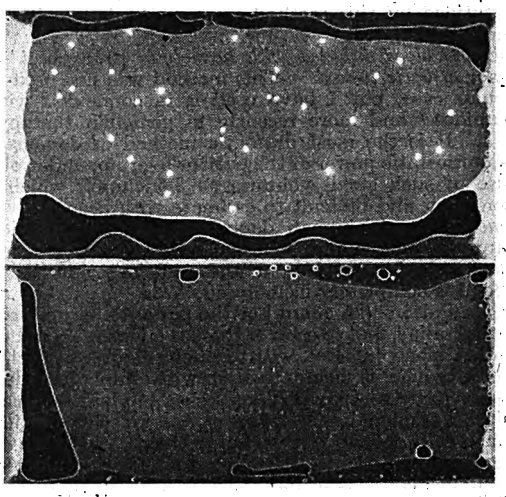

Fig. 1.—Testing bacteriostatic power of patient's serum. Growth of staphylococcus in slide cells containing patient's serum. *Above*, before penicillin treatment, showing well-defined colonies. *Below*, after penicillin treatment, showing no colonies.

advantage over undiluted serum that it is a clearer fluid, and that the dilution eliminates any stray bacteriostatic substance which may be present in serum. The diluted serum is preferable to saline as a diluent, for in the serial dilutions the last volume can be left merely as diluting fluid, and if good colonies of staphylococcus develop in this and they do not appear in dilutions of the patient's serum then one is certain that the bacteriostasis is due to something in the patient's serum.

1. *Slide-cell method.*—Serial dilutions of serum (50 c.mm. volume) were made, and these were mixed with 2·5 c.mm. of a suitable dilution of a 24-hour broth culture of staphylococcus (1 in 80,000) or streptococcus (1 in 5000). The mixtures were run into slide cells, sealed and incubated. The organisms grow into separate colonies which are easily counted (fig. 1). The amount of the inoculum of the test organism is important. The number of colonies which develop from 50 c.mm. of infected serum should be between 15 and 50. If less than 15 there might be a danger that through some error of technique so few would develop as to make it doubtful whether bacteriostasis has occurred, while if large numbers are present the colonies are crowded and small, rendering it difficult to see in which dilution the colonies have failed to develop.

The serial dilutions may be done on a simple two-fold scale by putting out a series of 50 c.mm. volumes of the diluent on a paraffined slide, then mixing 50 c.mm. of the serum to be tested with the first volume, carrying over 50 c.mm. to the second volume and mixing it, and so on, till as many dilutions as are required have been made. If it is desired to work more closely, 50 c.mm. volumes of the diluent are placed on the paraffined slide as before, then 100 c.mm. of the test serum is mixed with the first volume, 100 c.mm. of this is mixed with the second volume, and so on. This gives (assuming undiluted serum is also used) dilutions of 1/1, 2/3, 4/9, 8/27, 16/81, &c.

There is no difficulty in measuring 2·5 c.mm. of the inoculum with sufficient accuracy using a home-made pipette,[2] provided that the outside of the end of the pipette is paraffined to prevent

2. It is easy to prepare calibrated capillary pipettes measuring from 2·5 c.mm. to 100 c.mm. by the aid of the "automatic pipette" described by A. E. Wright and L. Colebrook in their *Technique of the Teat and Capillary Glass Tube*, London, 1921 (quoted in the MRC *System of Bacteriology*, vol. IX, p. 178).

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fluid adhering to it. This is readily done by heating the pipette by passing it through the bunsen flame (this is necessary to sterilise the pipette), and rolling the distal half-inch on a slide covered with a thin layer of paraffin wax.

2. *Capillary culture method.*—This is simpler than the above as it does not necessitate the preparation of slide cells, but the results are not quite so easily read. A 25 c.mm. volume of diluted serum is mixed with 2·5 c.mm. of culture diluted as above and the mixtures are run into capillary tubes so that the column of fluid occupies about 2 inches of the tube. The capillary is then sealed and incubated horizontally, stuck in position in "Plasticine" on a microscope slide. The organisms grow out into separate colonies. Observations by this method were made daily with results shown in table I.

3. *Using blood infected with hæmolytic streptococci as the indicator of bacteriostasis.*—This method was not used in this particular case, but I have used it in connexion with sulphonamides [3] and more recently in penicillin therapy, with success. It is the most dramatic method of demonstrating the bacteriostatic power of the patient's serum, and it obviates the use of such small volumes as 2·5 c.mm., which many workers may find difficult to estimate with accuracy. *Strep. pyogenes* grows in human defibrinated blood in slide cells, and around each colony is a very definite area of hæmolysis. If many colonies are present and sufficient time is allowed the blood is completely hæmolysed.

Serial dilutions (25 c.mm.) of the patient's serum are made in normal saline, and to each of these is added an equal volume of human blood infected with hæmolytic streptococci. If it is a case which is being treated with sulphonamides it is necessary to be very careful not to use too large an inoculum (a suitable implant is 0·1 c.cm. of a 1 in 1000 dilution of a 24-hour broth culture to 1 c.cm. of blood), but when dealing with penicillin patients the amount of the inoculum within wide limits makes little difference to the result, and I have found it convenient to use a loopful of a 24-hour broth culture in 1 c.cm. of blood. Normally human blood has a considerable bactericidal power for these cocci, due to the presence of leucocytes, so to avoid any confusion and to give an accurate estimation of the bacteriostatic power of penicillin in the patient's serum the blood should, before infection with streptococci, have its leucocytes removed or destroyed. This can be done in various ways—

(*a*) By deleucocyting.[4]

TABLE I—BACTERIOSTATIC POWER OF BLOOD-SERUM

Date Aug.	Penicillin dosage in thousands of Oxford units every 2 hr. before blood taken	Hours after injection when blood taken	Bacteriostatic power of serum. Growth in dilutions of serum as under infected with—								
			Staphylococcus					Streptococcus (patient's)			
			1/1	1/2	1/4	1/8	1/16	1/1	1/2	1/4	1/8
6	0	..	+	+	+	+	+	+	+	+	+
7	10	2	0	0	±	+	+	0	+	+	+
8	10	2	0	0	±	+	+	0	+	+	+
9	10	2	0	±	+	+	+	0	+	+	+
10	20	2	0	0	0	0	+	0	0	0	+
11	15	2	0	0	0	±	+	0	+	+	+
12	15	1*	0	0	0	0	+	0	0	0	+
13	10	2	0	±	+	+	+	±	+	+	+
14	7·5	2	0	±	+	+	+	0	+	+	+
15	7·5	½*	0	0	+	+	+	0	+	+	+
16	10	2*	0	0	+	+	+	+	+	+	+
17	10	½*	0	0	0	±	+	0	0	±	+
18	10	2	0	±	+	+	+	+	+	+	+
19	..	18	+	+	+	+	+	+	+	+	+
20	..	48	+	+	+	+	+	+	+	+	+

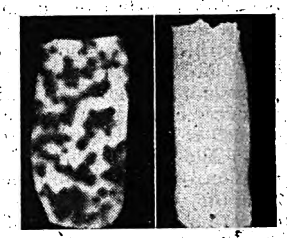
* Note increased bacteriostatic power when serum tested at shorter interval.
0 = No colonies. ± = Colonies smaller and fewer.
\+ = Colonies as large and as numerous as in the control normal serum.

3. Fleming, A. *Lancet*, 1938, ii, 564.
4. Fleming, A. *Brit. J. exp. Path.*, 1926, 7, 231.

(*b*) By heating to 50° C. for 30 min.

(*c*) By adding liquoid to make a concentration of 1 in 1000. This is convenient as it prevents the blood clotting and renders defibrination unnecessary.

(*d*) By the use of blood which has been collected for more than 2 days, when most of the leucocytes have perished. The infected blood-serum mixtures are placed in slide cells, sealed and incubated. Where there is no bacteriostasis the streptococci cause areas of hæmolysis, but when the streptococci are prevented from growing no hæmolysis occurs. (These mixtures can be incubated in capillary tubes but the results are not so striking.) Fig. 2 gives a typical result.



a *b*

Fig. 2—Testing bacteriostatic power of patient's serum using *Strep. pyogenes* in blood as indicator. Serum (*a*) before, and (*b*) after penicillin treatment. Dark spaces represent areas of hæmolysis due to streptococcal growth.

A permanent record of slide cells prepared in this way can easily be made. The series of cells are placed on a piece of bromide paper in the dark-room, and an accurate print is made by exposing them for 1 or 2 seconds to the light of an ordinary electric lamp placed 3 feet or so above the paper; or the slide cells may be placed in an enlarger and sharply focused enlargements may be made. These recording methods are so easy that if a dark-room is close to the laboratory it is almost quicker to make a print and incorporate it in the notes than it is to write up a description of the results.

This is probably the most convenient and convincing method of demonstrating the bacteriostatic power not only of serum but also of cerebrospinal fluid, or of any other body fluid.

By these methods the following observations were made:

(*a*) That the patient's streptococcus was only about half as susceptible to the bacteriostatic power of the penicillin-treated patient's serum as was the test staphylococcus. It had previously been determined that this was the ratio of sensitivity when cultures of these two organisms were tested to penicillin by the impregnated strip method on a blood-agar plate.

(*b*) That the patient's serum, which had no bacteriostatic power before penicillin was administered, promptly became bacteriostatic and maintained this power throughout the course of treatment.

(*c*) Normally the blood was collected 2 hours after an intramuscular injection (immediately before the next one), but on three occasions the blood was collected after a shorter interval and on all these occasions the bacteriostatic power of the serum was appreciably higher. The blood should be tested within a few hours of its withdrawal or, if the examination has to be postponed till next day, it must be stored in the refrigerator. If kept for 24 hours at room temperature the small amount of penicillin contained in the blood-serum may lose part or all of its activity.

CEREBROSPINAL FLUID

When first examined the cerebrospinal fluid was almost clear, but it later became definitely turbid from the presence of polynuclear cells. On several occasions no organisms could be discovered, but eventually by the use of "sloppy" glucose agar small numbers (about 6 per c.cm.) were found on two successive occasions. No organisms could be recovered on any occasion after the beginning of penicillin treatment.

After penicillin treatment had begun each specimen of CSF was examined in regard to its bacteriostatic power to staphylococcus and the patient's streptococcus. Tests were made by the same methods which were used for the blood-serum, but as CSF is a poor culture medium for staphylococci it was necessary to use normal serum (or diluted normal serum) as a diluent. The results obtained are set out in table II.

When the CSF contains considerable amounts of penicillin after intrathecal injection, estimations of the bacteriostatic power can be made by simple titrations in infected broth (using 0·5 or 1·0 c.cm. quantities), just as is done in the original titrations of penicillin.

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TABLE II—RESULTS OF EXAMINATION OF CEREBROSPINAL FLUID

Date Aug.	Turbidity	Colour	Protein content (mg./c.cm.)	Conc. of CSF inhibiting growth		Conc. of blood-serum inhibiting growth (for comparison)	
				Staph.	Strep.	Staph.	Strep.
11	+	Nil	...	1 in 2	2 in 3	1 in 4	1 in 1
12*	+	Nil	140	1 in 2	5 in 7	1 in 8	1 in 4
13*	+++	Yellow	160	1 in 40	1 in 20	1 in 2	1 in 1
14*	++	Yellow	180	1 in 160	1 in 40	1 in 2	1 in 1
15*	++	Yellow	240	1 in 40	1 in 40	1 in 2	1 in 1
19	Trace	Nil	70	No inhibition in 67% CSF		No inhibition in undiluted serum	

* Intrathecal injections of penicillin.

The bacteriostatic power of the CSF was also tested by the "agar cup" method, in blood-agar plates, with the following results:

Date	Distance of inhibition from edge of cup (mm.)	
	Staph.	Strep.
Aug. 12	0	0
„ 13	13	4
„ 14	14	6·5
„ 15	11	2·5
„ 19	0	0

The bacteriostatic power of the CSF withdrawn on Aug. 14 (which had been found to have the highest value) was compared with that of sulphathiazole (1 in 5000) by the "impregnated strip" and agar cup methods, with the following results:

Method	Organism	Distance of inhibition from drug (mm.)	
		CSF	Sulphathiazole 1 in 5000
Impregnated strip	Strep.	11	0
Agar cup	Staph.	15	5

COMMENTS

Diagnosis.—When the patient was admitted there were no signs or symptoms pointing to meningitis. As soon as any localising signs were observed the state of the CSF indicated a meningitis, but the infecting organism could not be seen in the fluid nor was it cultivated until a special method—"sloppy" glucose agar—was used. Even then it appeared to be present in very small numbers, about 6 per c.cm. The infecting streptococcus was of an unusual non-hæmolytic type, but that it was the actual infection was shown by the fact that, apart from its being isolated in pure culture on two successive occasions, it was strongly agglutinated by the patient's serum but by none of the normal serums tested.

Clinical effect of sulphonamides.—The first course of sulphapyridine brought the temperature down to normal, but as soon as it was stopped the fever returned, and a subsequent course of sulphathiazole had no effect. When the streptococcus was isolated it was completely resistant to sulphathiazole. It may be that originally the infecting streptococcus was partially sensitive to the sulphonamides, so that at first it was to some extent affected by the sulphapyridine, and then it became sulphonamide-fast, so that the subsequent administration of sulphathiazole had no effect. This, however, is supposition as the organism was not isolated until after sulphathiazole had been administered for some days.

Effect of penicillin.—When intramuscular injections of penicillin were commenced the patient appeared to be dying. Within 24 hours there was a definite improvement—temperature dropped, hiccough ceased, and he was mentally more alert. There were two rises of temperature after 3 and 5 days, and as the bacteriostatic power of the CSF had not risen as high as that of the blood an intrathecal injection of penicillin was given (5000 units in 20 c.cm. of water). This gave no clinical reaction although there was evidence of some slight irritation by an increased emigration of polynuclear leucocytes. The intrathecal injection was repeated on 3 successive days, and then half the dose was given intrathecally dissolved in the patient's serum to provide opsonic substances which were lacking in the CSF (as they are normally). Whether this last combination was better than mere solution in water it is impossible to say, but theoretically, since penicillin is essentially bacteriostatic so that the cocci have to be killed by the natural defences, it seemed reasonable to provide opsonic substances so that the polynuclear cells which were abundant in the fluid should be able to ingest and destroy the cocci.

The intramuscular injections caused little or no local reaction, but as they were given every 2 hours day and night for 9 days the patient ultimately complained of tiredness from lack of sleep. The injections were then continued 2-hourly for 3 days during the day only and the patient was allowed to have a night's sleep undisturbed. It is likely that the treatment was continued too long, but as there was no satisfactory means of checking this it was considered wise to err on the safe side.

Bacteriostatic power of blood during penicillin treatment.—Throughout treatment a two-fold dilution of the patient's serum completely inhibited the growth of staphylococcus (except on a few occasions). The highest figure obtained (when the blood was taken immediately *before* an injection of penicillin) was complete inhibition of staphylococcus by an eight-fold dilution of serum. As regards the patient's infecting streptococcus, there was complete bacteriostasis by undiluted serum except on one or two occasions, and on one occasion a four-fold dilution of the serum completely inhibited growth.

It is possible, therefore, over a considerable period to render the patient's blood strongly bacteriostatic by 2-hourly intramuscular injections of penicillin.

If the undiluted serum is completely bacteriostatic dosage is probably sufficient, but if the bacteriostatic power of the serum can be increased so that a two-fold dilution or more is bacteriostatic it is an obvious advantage.

Bacteriostatic power of CSF.—Before the intrathecal injection of penicillin the bacteriostatic power of the CSF was less than that of the blood-serum, indicating that penicillin did not pass freely from the blood to the fluid. Fluid removed 24 hours after intrathecal injection on three successive days had a very strong bacteriostatic power, the highest reading being complete bacteriostasis of staphylococci in a 1 in 160 dilution of the fluid (blood-serum taken at the same time showed complete bacteriostasis only in a 1 in 2 dilution). This again showed that there was not a free interchange of penicillin between the CSF and the blood. The yellow colour of the impure penicillin injected was also very obvious in these specimens (as it was in the blood-serum to a lesser degree while intramuscular injections were being given). The last specimen of CSF, which was taken 4 days after an intrathecal injection of penicillin, had no yellow colour and no bacteriostatic power, so it is evident that the bacteriostatic power disappears at some period between 24 hours and 4 days.

Effect on the elements of the blood.—There was no change in the blood-urea or hæmoglobin content. Throughout the illness there was a polynuclear leucocytosis of about 15,000 per c.mm. As recovery progressed the leucocyte count fell to normal and remained there. There was therefore no indication that penicillin affected the kidneys or the blood-forming mechanism.

SUMMARY

A man of 52 who was apparently dying of a streptococcal meningitis made a complete recovery after intramuscular treatment with penicillin for 11 days and 4 concurrent intrathecal injections of the drug.

The patient had already received courses of sulphapyridine and sulphathiazole, and the organism had become sulphonamide-fast.

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For one intrathecal injection the penicillin was dissolved in the patient's serum, to provide opsonic substances.

Neither the intrathecal nor the intramuscular injections caused any significant local or general reaction.

The bacteriostatic powers of the blood and cerebrospinal fluid were followed throughout penicillin treatment.

My thanks are due to Professor Florey for the supply of penicillin, and for his advice as to administration and dosage, to Dr. T. A. Kemp and Dr. Duncan Gregg for their assistance, and to Sister Downer whose unremitting care contributed materially to the satisfactory result.

MECHANICS OF HEAD INJURIES

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THE assumption that there is a mechanics of head injuries implies that, when the head receives a blow, the behaviour of the skull and brain during and immediately after the blow is determined by the physical properties of skull and brain and by Newton's laws of motion. The most important physical properties of brain are:—

(*a*) Its comparatively uniform density. Nerve tissue, blood, and cerebrospinal fluid all have about the same density as water.

(*b*) Its extreme incompressibility. Brain substance does not appreciably change its size when subjected to a pressure which is uniform in all directions (a so-called hydrostatic pressure), and the incompressibility is about the same as that of water—it would take, for example, a force of about 10,000 tons to compress the brain to half its volume.

(*c*) Its very small modulus of rigidity. That is to say, brain offers a very small resistance to changes in shape compared with the resistance it offers to changes in size. For example, every surgeon knows that it takes only a small force on a retractor to produce quite a large deformation of the brain—nothing remotely comparable with 10,000 tons.

(*d*) Compared with the feeble rigidity of the brain the rigidity of the skull is very great. For example, it takes about 1 ton to reduce the diameter of the skull by 1 cm.

(*e*) The shape of the skull and brain are important in deciding the location of injuries.

(*f*) It is reasonable to suppose that the brain behaves like the substances whose properties have so far been studied, and therefore that it is injured when its constituent particles are pulled so far apart that they do not join up again properly when the blow is over. In the case of a substance such as brain, whose modulus of incompressibility (bulk modulus) is large compared with its modulus of rigidity, the amount of pulling apart of the constituent particles is proportional to the shear-strain. (Shear-strain, or slide, is the type of deformation which occurs in a pack of cards, when it is deformed from a neat rectangular pile into an oblique-angled pile.) Hence the shear-strain present at any point in the brain should be at any rate a rough measure of the probability of injury at that point. In other words, shear-strains are the cause of injury, whereas compression and rarefaction strains are not. This is in conformity with the known results for peripheral nerve. Thus, Grundfest [1] found that nerves continued to conduct when subjected to a compression strain due to a pure hydrostatic pressure of 10,000 lb. per sq. in. Of course, this hydrostatic pressure is vastly greater than anything which can arise in a head injury. If, however, the pressure is not a purely hydrostatic one—if it is different in different directions—it must involve some shear, and a very small pressure of this type may be sufficient to injure a nerve. The injuries to nerves produced by crushing with forceps or by stretching are examples of the effects of shear. Even when a nerve is squeezed with a pressure-cuff, the pressures are not equal at all places and in all directions, and therefore there are shear-stresses. It is undoubtedly these shear-stresses, and not the hydrostatic pressure, which produce the effects on the nerve.

On the basis of the five properties (*a*–*e*) of the skull-brain system, one can predict the distribution of shear-strains, and therefore the locations of injuries, resulting from various types of blow. The mathematical theory falls naturally into two halves: (1) injury to the brain occurring as a result of distortion of the skull; and (2) injury to the brain occurring whether or not the skull is distorted.

1. Grundfest, H. Cold Harbor Symposia on Quantitative Biology, 1936, vol. IV, p. 179.

LOCALISED INJURY DUE TO SKULL DISTORTION

As one would expect, distortion of the skull is most severe near the point of application of the blow. It consists mainly of an indentation of the skull. If fracture of the skull does not occur, the shear-strains in the brain are mainly confined to a superficial region close to the dent; hence the injury to the brain consists mainly of a superficial bruising near the point of application of the blow. Waves of compression and rarefaction (sound waves) emanate from this region and travel back and forth through the brain, but since, as explained in (*f*), it is only shears which are injurious, these sound waves do not cause any damage.

If the skull fractures, then shear-strains are produced in the brain in the immediate neighbourhood of the fracture, so that the injury is comparatively superficial in this case also. A fracture in the skull is the most probable cause of tearing of the dura, particularly where it is strongly adherent, as in the very young and very old. When hæmorrhage from a large vessel does take place, its most probable location is where a fracture line crosses the vessel, because the shears are largest near the fracture. In this way, extradural, subdural and subarachnoid hæmorrhages can occur. The shears which arise as a result of skull distortion without fracture are much smaller and therefore probably hardly ever cause hæmorrhages from large vessels. Subdural and subarachnoid hæmorrhages from large vessels may also result from the second mechanism of injury, which will now be considered.

INJURY DUE TO ROTATION

As well as the strains which arise in the brain as a consequence of cranial bending there are others which could arise even if the skull were absolutely undeformable. These are called into play by the change in the velocity of the head caused by the blow. The most general type of change in velocity which a blow can produce can be analysed into a change in the straight-line, or linear, velocity together with a change in the rotational velocity about some axis. Hence the forces which the most general type of change in velocity can produce can be analysed into the linear acceleration forces due to the change in linear velocity, and centrifugal forces, coriolis forces and rotational acceleration forces, due to the change in rotational velocity. The linear acceleration forces tend to produce compressional or rarefactional strains which, from (*f*), have no injurious effect. The shear-strains, which are also produced by the linear acceleration, are small. They are produced mainly in the neighbourhood of foramina where tissue has a tendency to be extruded or sucked in, and in the neighbourhood of ventricles owing to the slight difference in density between CSF and brain tissue. These shear-strains produced by the linear acceleration forces are small compared with those accompanying the change in rotational velocity, and may therefore be neglected, at any rate as a first approximation.

Blood as well as tissue can be sucked in or pressed out through foramina as a result of either the linear acceleration or the skull bending, but owing to the viscosity and inertia of the blood the amount involved is small. In addition the effect only lasts during the blow. Hence, it can be neglected, at any rate as a first approximation. In any case it can never be the cause of, say, small capillary hæmorrhages in regions remote from foramina.

That no appreciable relative movement takes place between the constituent parts of the brain as a result of the linear acceleration may readily be verified by anyone who cares to fill a narrow-necked flask with water, and to add a little shredded cotton-wool in order to render visible any movement of the water. A purely linear change in the velocity of the flask produces no visible effect in the water—it moves bodily with the flask. Water has no rigidity, so that very small forces tending to produce deformations in the water would readily be detected if they existed. The idea that the brain is loose inside the skull, and that when the head is struck it rattles about like a die in a box, thereby causing coup and contrecoup injuries, is erroneous.

The centrifugal and coriolis forces called into play by the rotation can also be neglected, because they are

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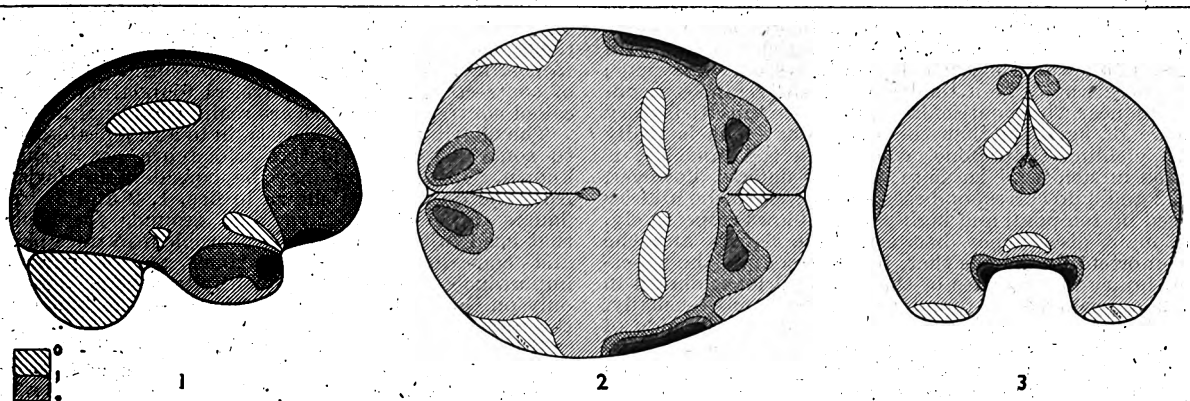

Fig. 1—Intensity of the shear-strains resulting from a forwards rotation caused by a blow on the occiput.
Fig. 2—Intensity of the shear-strains due to a rotation in the horizontal plane caused by a blow near the upper jaw or temples.
Fig. 3—Intensity of the shear-strains due to a rotation in the coronal plane caused by a blow above the ear.

Key—Scale of maximum shear-strain (= distortion) in arbitrary units of shear. The units differ in the three diagrams.

small, and not of a type very liable to cause injury. Usually the rotational acceleration forces are the main cause of brain injury. That the change in the rotational velocity of the head is likely to cause injury may easily be seen by giving a sudden rotation to the flask full of water mentioned previously. The water tends to stay behind, and only the flask rotates. Hence, as a result of the rotation a particle of water attached to the inside surface of the flask becomes separated from a neighbouring particle not thus attached. Large shear-strains are produced. Water is, of course, less rigid than the brain, so that this model exaggerates the effect of shearing stresses.

Fig. 1 is a parasagittal section of the brain passing through the tip of the temporal lobe. The shear-strains shown in it are those which are produced by a rotation such as might be caused by a blow on the occiput. The figure was obtained by making a model of this cross-section of the brain out of 5% gelatin, with ½% formalin added as a preservative. The gelatin was cast into the paraffin-wax "skull," and then cut free with a taut wire. After this, the model was allowed to stand until slight adhesions grew across the water-filled gap between "brain" and "skull." By this means there was obtained a shear-strain distribution which was intermediate between that for the "brain" completely free from the "skull" and that for the "brain" firmly attached to the "skull." The gelatin adhesions had a rough mathematical correspondence with the attachments between the pia and the somewhat less extensible arachnoid. When the model, placed in a circular polariscope, was given a sudden forwards rotation, the shear-strains in the gelatin became visible owing to the colours they produced in the field of view (Coker and Filon).[2]

The strains could be calculated mathematically by the method of relaxations. Hence the jelly is to be regarded merely as an elegant and rapid calculator of the strains in a system with the properties (*a*–*e*). Gelatin is used merely for convenience. Exactly the same shear-strains would arise, for example, in glass or metal. Even in the case of an alloy consisting of an aggregate of crystals of different sizes, shapes, densities and elasticities, the shear-strains, averaged over regions large compared with the size of the crystals, are exactly the same as in gelatin. But the average shear-strain in a particular region of an alloy gives no clue as to what exactly happens to the crystals there. For example, the crystals may themselves be uniformly strained, or they may be strained only in parts, or they may merely move relative to one another. In the same way, though the shear-strains obtained from the jelly model indicate the regions of brain liable to damage, they give no indication of what this damage consists. It may consist of tearing of blood-vessels, tearing of axons, disrupting of cell bodies, tearing apart of synapses, or injuring of some parts of the nerves by amounts insufficient to cause actual breakage.

1. Coker, E. G. and Filon, L. N. G. Treatise on Photoelasticity, Cambridge, 1931.

The most prominent features of fig. 1 are the large amount of shear-strain in the anterior part of the temporal lobe, and the comparative absence of shear-strain in the cerebellum. The main reason for the large amount of shear-strain at the tip of the temporal lobe is that the skull gets a good grip on the brain in this region owing to the inwardly projecting ridge of the lesser wing of the sphenoid bone, so that the skull rotates the brain mainly by means of the force it exerts on this portion of the brain. Hence this is where most of the strains appear. Elsewhere the brain tends to slip somewhat relative to the skull, so that smaller strains are produced. The relative slip between brain and skull is greatest near the vertex, which is far removed from any place where the skull can get a grip on the brain to turn it round. Hence the brain tends to get left behind in this region and it therefore rubs against the skull more than in other places. The superficial region of strain in the vertex is due to the effect of friction and connexions between skull and brain. This allows the skull to get a small amount of grip on the brain. In the case we are considering, of a blow on the occiput, this region of superficial shear-strain due to rubbing would extend to the falx, against which the brain would rub in the same way as against the vertex of the skull. The comparative absence of strain in the lateral cerebellar lobe is due mainly to its small size—it does not require such large forces to make it rotate as are required to make the cerebrum rotate. It should be noted that there is hardly any part of the brain which is completely free from strain.

What evidence there is from autopsies in the case of blows on the occiput confirms a distribution of hæmorrhages corresponding roughly to the areas of highest strain shown in fig. 1 (see, for example, Courville).[3] It is, of course, possible that the brain is also damaged in regions where the strain is insufficient to cause hæmorrhage.

That shear-strains correspond to damage in the case of a jelly is shown by fig. 4, which is a photograph of the model taken after it had been subjected to a more violent rotational jerking. Note that besides the region of extreme fragmentation in the temporal and frontal lobes there is a superficial layer near the vertex. The slight damage in the lateral sinus and occipital pole is an artefact. The appearance of the jelly is remarkably similar to the post-mortem appearance of a brain after an extremely severe occipital injury.

Figs. 2 and 3 are shear-strain diagrams for typical horizontal and coronal sections rotated in their own planes. Fig. 2 shows the effect of a rotation which would be most easily produced in real life by a sideways blow in the neighbourhood of the upper jaw. It would also be produced to some extent by a sideways blow on the temples. The rotation in fig. 3 corresponds to that which is most easily produced by a blow above the ear. Both these sections are somewhat more unsatisfactory than the previous one because the effect, on the section considered, of strains in neighbouring sections is more

3. Courville, C. B. *Arch. Surg.* 1942, 45, 19.

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marked than before. In addition, both these sections should really have sections of ventricle included in them. This would disturb the strain system somewhat; and there would be a tendency for the strains to congregate near the ventricular walls. An unsatisfactory feature of fig. 3 is that the cavernous sinus is really more yielding than bone, whereas in the model it is just as unyielding. In spite of these defects, however, figs. 2 and 3 do correspond reasonably well to the injuries caused by temporal and high parietal blows respectively. The main discrepancy between these figures and the post-mortem findings is that, by all accounts, the superficial injury at the sides of the temporal lobes shown in fig. 2 appears to be found at one side only—usually, though not invariably, the opposite side to the side of the blow (Courville[3]). It must be remembered, however, that these two figures refer only to those unusual cases in which the rotations are exactly in the planes of the sections. It will be just as unusual therefore to find exactly symmetrical damage of this type as it is to find exactly symmetrical damage due to a blow on the occiput. There are other less obvious factors making for asymmetry.

As the brain is so incompressible, it will be impossible for any empty spaces to be formed anywhere as a result of the blow. Hence, since no spaces can be formed between the skull and brain, the surface of the brain can never move away from the interior skull surface; it can therefore only slide along it. Since the dura is comparatively firmly attached to the skull, the motion of the dura relative to the skull will usually be negligible. Hence the main motion must be the sliding of the pia relative to the arachnoid and of the arachnoid relative to the dura—the latter being presumably greater. In this process the vessels which drain the cortical veins

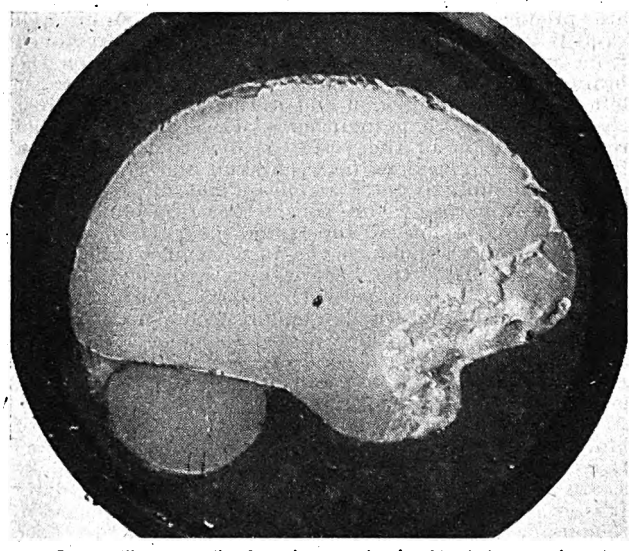

Fig. 4—Effect on a jelly of a violent rotational jerking in its own plane.

into the venous sinuses will be stretched, and may break anywhere along their length, causing subdural or subarachnoid hæmorrhages. For a rotation in the plane of fig. 1, the relative sliding motion is greatest near the vertex, since it is furthest removed from any place where the skull or dural processes are so shaped as to get a good grip on the brain. Hence this is the most probable region for hæmorrhages of this type. For rotations in the planes of figs. 2 and 3 the sliding is greatest at the sides of the convexities, but there are no communicating veins in this position. For all directions of rotation the sliding is minimal in the neighbourhood of the base, so that the cranial nerves, arteries and veins of the base usually escape rotational damage. When the pia moves relative to the arachnoid, the tethering trabeculæ and perforating vessels may be torn. This type of injury is most likely to occur near the vertex for rotations in the plane of fig. 1, and at the sides for rotations in the planes of either figs. 2 or 3.

If the gelatin model were given a purely linear change in velocity, no shear-strains would be visible, because, as previously mentioned, a change in linear velocity tends to produce compression and rarefaction only. Hence, for a system with the properties (*a*–*e*) the theory of contrecoup is without physical foundation. The so-called contrecoup injuries are really rotational injuries.

The distribution of shear-strain in a real brain depends to some extent on factors which are not accurately known. Hence there may be considerable deviations from the distribution shown in figs. 1, 2 and 3. These figures do, however, give good grounds for believing that head injury is primarily a problem in pure physics, and consequently that rotations are of paramount importance. The results which follow, being dependent only on the neglect of all the effects of the blow except the rotation, are more certain.

If there is no rotation or only a very small or slow one, there is no rotational injury. Thus, if the head is so well fixed that it cannot rotate at all when it receives a blow, there will be no rotational injury. Denny-Brown and Ritchie Russell[4] found that it was very difficult to produce concussion in cats when the head was fixed, but easy when it was free to move. This points to the fact that concussion is a rotational injury. One would certainly expect it to be so because skull-distortion injury is localised, and because much greater local injury to the cerebral hemispheres can be produced at operation without loss of consciousness. As is shown in figs. 1, 2 and 3, rotational shear-strains are present throughout the whole brain in greater or lesser degree, and are therefore much more likely to be the cause of a phenomenon such as unconsciousness. Up to the present, technical difficulties have prevented any estimation of the shear-strains in the brain stem. When a person's head is crushed between the slowly moving buffers of two railway trucks in a shunting accident, only a slow rotation can be produced; and in such accidents there is usually no concussion.

The momentum of a rifle bullet is surprisingly small, and therefore the rotational velocity it can produce is small. If a 10 g. bullet travelling at 400 metres per sec. is completely stopped by the head, the rotational velocity produced is about the same as that produced when one walks into a wall at 2 miles per hour. It is well known that wounds from low-velocity bullets often do not produce concussion. A bullet, owing to its small mass, is an example of an object having a large kinetic energy and at the same time a small momentum. It is owing to this that in low-velocity gunshot wounds the plainly visible injury to scalp, skull and brain in the path of the bullet (which depends mainly on the kinetic energy) is much larger than the invisible damage due to rotation (which depends mainly on the momentum). On the other hand, when the head hits a wall or a pavement, the masses involved are large so that the kinetic energies are small and the momenta large. Hence the plainly visible injury is in this case small compared with the invisible damage due to rotation. Now objects which are generally found in motion—bullets, balls, bricks, &c.—are usually less massive than the stationary objects which one's head is likely to hit. Hence collisions with stationary objects will usually produce more rotational damage than one would expect from the external injury. This is no doubt why it is often said that it makes a difference whether the head or the object causing the injury is in motion—a statement which, taken at its face value, is clearly absurd. For certain directions of blow at certain points of the head—notably points on the midline—a blow, however hard, produces no rotation. In association football, the direction of the ball and the point of the head at which it is "headed" are related in such a way that little rotation is produced by the impact. As an example of the opposite effect, one of the easiest ways of producing a rapid rotation of the head is to strike the chin sideways and upwards. This is the favourite knock-out blow in boxing.

For blows of long duration, the shear-strains in the brain are proportional to the force (assuming that the direction and point of application remain constant). That is to say, the injury is independent of the time for which the force acts. Hence one might say, from Newton's second law, that the injury is proportional to the acceleration, or rate of change of velocity of the head. On the other hand, for very short blows the injury is

4. Denny-Brown, D., and Russell, W. R. *Brain*, 1941, 64, 93.

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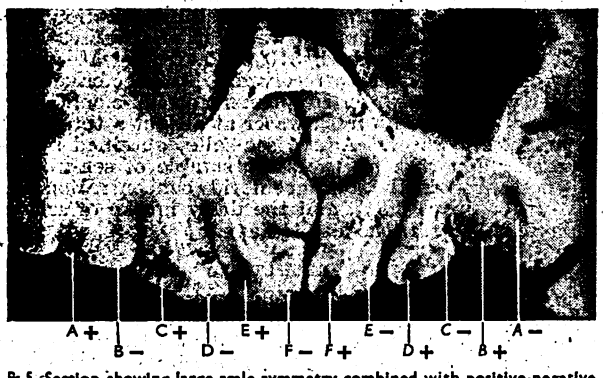

Fig. 5—Section showing large-scale symmetry combined with positive-negative symmetry in the details.

proportional to the force multiplied by the time for which it acts. Hence, from Newton's second law, the injury is proportional to the change of velocity of the head and not to the rate of change—i.e., acceleration. For this reason, the term "acceleration concussion" may well prove misleading. The change-over from one law of injury to the other occurs gradually somewhere in the region between 1/5 and 1/500 sec. Experiments are in progress to find a more accurate value for the critical duration of the blow. The change-over from one law of injury to the other is accompanied by a change in the distribution of the shear-strains. Figs. 1, 2 and 3 refer to forces of long duration.

Using the fact that the change in linear velocity produces no effect, and using the theorem in kinematics that any rotation about any axis is equivalent to an equal rotation about any other axis together with a translation, we have the result that equal rotations about all parallel axes produce exactly the same injury. For example, it makes no difference whether the rotation takes place about an axis through the centre of the brain or about a parallel one through a point in the neck.

Figs. 2 and 3 show sections of the brain in which the right-hand side is the mirror-image of the left-hand side. The strains on the right-hand side are also the mirror-image of the strains on the left-hand side. This symmetrical distribution holds for rotations about any axis lying in the median plane. But this result only holds accurately in the case of simple substances such as gelatin. For substances such as brain, in which the Young's modulus of elasticity for stretches parallel to the fibre directions may be different from the modulus for stretches perpendicular to the fibre directions, and in which the relationship between stress and strain is non-linear, this symmetry is not perfect. A more accurate statement of the facts in the case of rotations about any axis in the median plane is as follows: the large-scale injury on one side of a symmetrical section of the brain is approximately the mirror-image of the large-scale injury on the other side, but the minor details need not be mirror-images—for example, they may in exceptional circumstances be as it were negatives on one side and positives on the other. Fig. 5 shows the predicted effect. The injured gyri on one side correspond to the injured gyri on the other, but in each individual gyrus an injured portion on one side is the mirror-image of an uninjured portion on the other.

In the case of symmetrical sections, we can at once see that whether the rotation consists of a bending to the right or a bending in the opposite direction, the large-scale injury, being symmetrical, will be approximately the same in either case. But it can be shown that this result is not confined to symmetrical sections. For example, theory shows that the large-scale injury produced by the rotation which occurs when the head is struck centrally on the occiput is approximately the same as that produced by the opposite rotation which occurs when the head is struck centrally on the forehead (fig. 1 refers in fact to either blow). The details may, however, be different. In this connexion a remark by Courville is interesting: "Essentially identical lesions of the subfrontal and anterior temporal regions result from contact of either the frontal region or the occipital region of the moving head."

SUMMARY

The theory of head injury is developed on the assumption that, during and immediately after the blow, all factors other than the purely physical can be neglected.

On this assumption there are two main causes of injury: (1) deformation of the skull with or without fracture; and (2) sudden rotation of the head which is responsible for the so-called contrecoup injuries, for some intracranial hæmorrhages and probably for concussion.

The agreement between the theoretical predictions and the observed facts is good, considering the number of data which are only imperfectly known. Hence one can be reasonably confident that only minor modifications to the theory will be necessary to explain quantitatively the usual type of accident.

It is impossible to thank all those who have been helpful. This research would not have succeeded without the help of, among others, Prof. Hugh Cairns, Major W. Ritchie Russell, Dr. Dorothy S. Russell, Mr. G. F. Rowbotham, Dr. A. H. T. Robb-Smith and Dr. David Whitteridge, together with the facilities of the Oxford University Laboratory of Physiology placed at my disposal by Prof. E. G. T. Liddell.

EFFECTS OF DRINKING SMALL QUANTITIES OF SEA-WATER

AN EXPERIMENTAL STUDY

W. S. S. LADELL, M R C.S *

(*From the Research Unit, National Hospital, Queen Square*)

DURING the last year work has been carried out in this laboratory, for the Medical Research Council's committee on the care of shipwrecked personnel (MRC War Memorandum No. 8), on the physiology of subjects receiving the same food and water as shipwrecked men in lifeboats.† A full report of all the work has been prepared and will be published elsewhere; in the meantime results and conclusions which have to do with the consumption of sea-water are presented here. In particular the effects of drinking sea-water upon the chloride balance, the urea excretion, the urinary output, and the body-weight losses of the shipwrecked man—called for short, the "man on the raft"—are considered in some detail. Some references to experiments in which salt water was not drunk are also made.

An extensive series of experiments has shown that a man requires between 800 c.cm. and 1000 c.cm. of water per day to satisfy all his requirements, the actual amount varying with the previous metabolic history of the subject, his activity and his diet during the experiment. With an intake less than this he contracts a "water debt" to his own tissues. It was found that a man in water debt continues to produce 350–450 c.cm. of urine per day. The same low output was found whether the water debt was large or small and it was maintained throughout the longest experiments, which were for no water intake 4 days, and for limited water intake 10 days (1 day no water; 5 days 540 c.cm.; 4 days 60 c.cm. per day). During the period of low urinary output the urea concentration in the urine rose to as much as 6% but the total urea output was inadequate, and there was nitrogen-retention with a rise in blood-urea. At the same time salt losses in the urine were high on the first day, but they fell in a day or two to a low level. In all experiments the diet provided not more than 1 gramme of sodium chloride daily, but the excretion was greater than this, so there was always a slight negative salt-balance in those experiments where no sea-water or saline was drunk.

In addition to the physiological effects which are described later there was, under these experimental conditions, a definite psychological value in having the extra volume of fluid available for drinking, even though it was salt to taste. This was not only my personal

* Receiving a research grant from the Medical Research Council.

† The secretary, Dr. B. S. Platt, asks us to point out that the committee, in Memorandum No. 8, do *not* recommend the drinking of sea-water. In reaching this decision they took account of other relevant factors besides the evidence recorded in the present paper.—ED. L.

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TABLE I—OUTLINE OF EXPERIMENTS

		Experiment number:						
		1	2a	Control to 2a	2b	Control to 2b	3	4
Subjects		3	5	5	5	6	5	2
Waterless period. Days		1	1	1	1	1	1	1
Preliminary fresh water period	Days	0	0	..	0	..	5*	2
	Daily intake (c.cm.)	..	..	..	..	..	540*	370
Salt water drinking period (1)	Days	4½	5	5	5	5	..	3
	Daily fresh water intake (c.cm.)	240	540	540	540	540	..	240
	Daily salt water intake (c.cm.)	180†	180	0	180	0	..	400
	Daily sodium chloride intake (g.)	6·3	6·3	0	6·3	0	..	14
Salt water drinking period (2)	Days	..	4	4	4	4	4	1½
	Daily fresh water intake (c.cm.)	..	60	60	60	60	60	0
	Daily salt water intake (c.cm.)	..	0‡	180*	180	0	180	240
	Daily sodium chloride intake (g.)	..	0‡	6·3*	6·3	0	6·3	14

* The subjects in this control experiment had a sea-water supplement in the second period and formed experiment 3.
† Saline; in all other experiments sea-water was drunk.
‡ The subjects in experiment 2a had no sea-water in the second period and became a control group for 2b and 3.

experience but was confirmed by unsolicited statements from, and by careful interrogation of, the subjects.

EXPERIMENTAL PROCEDURE

Four experiments have been carried out, with subjects drinking salt water or saline while in water debt. Table I gives the plan of each experiment. In the first three experiments the subjects were observed for the 24 hours immediately before the experiment, when their food and water intake was still unrestricted. In all the experiments the food ingested was the "shipwreck diet"; this comprises 1 oz. each per day of: biscuits; sweetened condensed milk; butter, fat or margarine; and chocolate. In experiment 1, after an initial waterless day, three subjects, for 4½ days, drank each day 240 c.cm. of fresh water supplemented with 180 c.cm. of 3·5% sodium chloride solution. In experiment 2, ten subjects, again after an initial waterless day drank, each day for 5 days, 540 c.cm. of fresh water supplemented with 180 c.cm. of sea-water; these subjects were compared with a control group of eleven under exactly the same conditions but without the sea-water supplement. After the 5-day period with 540 c.cm. of fresh water daily the sea-water drinking subjects were divided into two groups; one group of five (2a) ceased having the sea-water supplement and had a further period of 4 days with only 60 c.cm. of fresh water daily; the other group (2b) for the same period also had their fresh water cut to 60 c.cm. per day, but continued with the sea-water supplement of 180 c.cm. All the members of the control group already mentioned had their water intake reduced after the initial period with 540 c.cm. per day, to 60 c.cm. per day for the last 4 days, and five of these subjects received a sea-water supplement during this time of 180 c.cm. per day, making experiment 3. In experiments 1, 2 and 3, involving seventeen different subjects (one subject took part in both experiments 1 and 2) the daily intake of sodium chloride was 6·3 g. The sea-water used contained only 3·2% of sodium chloride and not 3·5%, so the daily intake was fixed in practice by adjusting the actual salt content of the sea-water. In experiment 4 the subject who had been in both experiments 1 and 2 and another subject had, while on the shipwreck diet, first a control day with unlimited water, then a waterless day, followed by 2 days with 370 c.cm. fresh water daily; for the next 3 days they received daily 240 c.cm. of fresh water with a sea-water supplement of 400 c.cm. and for the last 36 hours no fresh water at all but a total of 600 c.cm. of sea-water. Added sea-salts, obtained by evaporating a portion of the same sample of sea-water to dryness, brought the sodium chloride concentration in the sea-water up to 3·5%, and the daily intake of salt was therefore 14 g. for the last 4½ days.

RESULTS

Chloride balance.—In all four experiments there was a lag in the excretion of sodium chloride. For the first 24 hours or more after beginning to take the salt water there was little change in the volume of urine excretion, with no rise in the chloride concentration, and hence there was a chloride retention; then suddenly, within the space of a few hours there was a great rise in the chloride concentration of the urine, and some increase in the urine volume, though the rise in this was more gradual; thereafter there was a balance between daily chloride intake and daily chloride excretion. It was noticed that the chloride retained during the latent period between increased chloride intake and increased chloride excretion balanced the amount of chloride that had been lost in the preliminary period upon the shipwreck diet with no water or limited water intake. This is the first point of interest: its possible significance is discussed later.

Nitrogen retention and blood-urea.—The nitrogen retention varied according to the condition of the experiment. In expts. 1, 2a and 2b the blood-urea rose during the waterless day an average of 8 mg. per 100 c.cm.; on drinking saline or sea-water there was no further change in the blood-urea throughout the period of the experiment in 1 and 2a, and throughout the final period of 2b. In the control group to expt. 2 the average rise was 8·4 mg. during the waterless day, and the blood-urea rose no further during the period when the water intake was 540 c.cm. per day with no sea-water. At this level of fresh water intake, therefore, sea-water had no effect on nitrogen retention. In the second period of expt. 2b and in expt. 3 the blood-urea rose in the 4 day period an average of 9 mg. per 100 c.cm. of blood above its previous raised though constant level: but in the control group having the same amount of fresh water and the same diet and activity, but no sea-water, the average rise was 17·5 mg. In expt. 4 the blood-urea

BLOOD-UREA CHANGES DURING WATER DEPRIVATION (subject I)

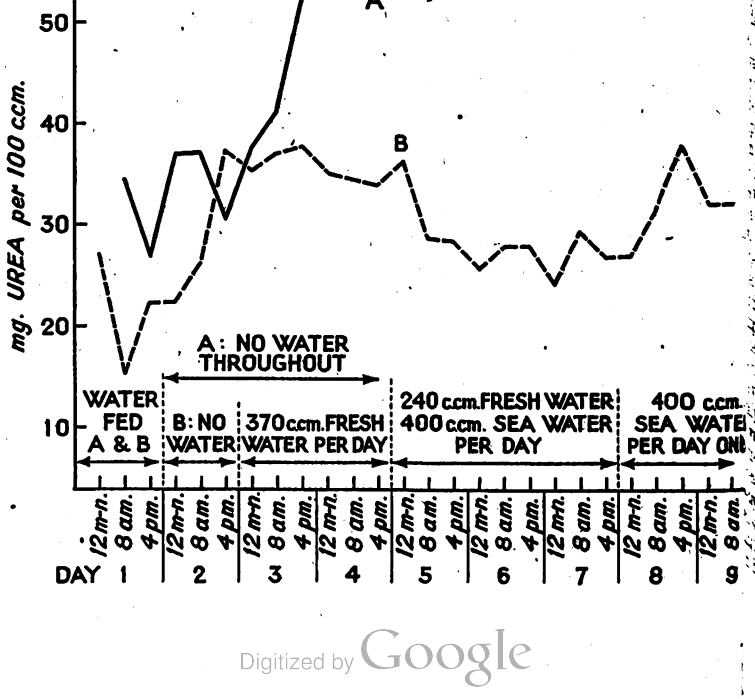

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TABLE II—BLOOD AND URINE INVESTIGATIONS IN EXPERIMENT 4

Day of expt.	Conditions: shipwreck diet and		Subject 1						Subject 2					
			Urine			Blood-urea			Urine			Blood-urea		
	Fresh water (c.cm.)	Sea-water (c.cm.)	Vol. c.cm.	NaCl output g.	Urea output g.	Mid-night	8 AM	4 PM	Vol. c.cm.	NaCl output g.	Urea output g.	Mid-night	8 AM	4 PM
						mg. per 100 c.cm.						mg. per 100 c.cm.		
1	Unlimited	Nil	2260	8·55	25·78	29·2	19·5	16·8	2750	7·51	25·36	27·3	15·5	22·7
2	Nil	Nil	1567	2·65	13·09	12·9	28·0	28·6	1535	1·90	15·74	22·7	26·6	37·6
3	370	Nil	372	1·08	17·28	39·6	46·6	43·3	390	1·26	16·90	35·7	37·6	37·3
4	370	Nil	382	0·87	20·34	49·9	43·3	42·7	365	0·70	17·19	38·0	35·4	34·7
5	240	400	450	3·41	21·47	43·3	44·6	32·2	466	2·90	16·82	34·0	36·6	28·9
6	240	400	620	10·11	19·25	31·6	29·5	32·7	784	10·23	17·99	28·6	25·9	28·1
7	240	400	704	13·46	18·36	29·4	28·1	37·5	825	14·26	18·86	28·2	24·2	29·5
8	Nil	400	765	15·57	19·22	32·8	27·6	31·5	840	15·28	17·66	26·9	26·9	31·5
9 (half day)	Nil	200	442	9·88	8·59	35·5	34·5	..	438	8·69	10·05	38·1	32·1	..
9* (half day)	Unlimited	Nil	4031	17·88	39·37	..	..	24·3	1807	7·87	29·67	..	..	32·1
10* (half day)	..	..	..	..	..	31·5	30·2	..	..	..	..	36·1	23·6	..

* Second half of day 9, and first half of day 10 formed the rehydration period—unlimited food and water intake. Diet rich in protein.

raised during the waterless day, fell when the subject began to drink sea-water, to the pre-experimental level and remained there (see figure, curve B). The changes in the blood-urea may be of considerable importance; their mechanism will be discussed later.

Urinary excretion.—A diuresis occurred in all experiments in which sea-water or saline was drunk. No diuresis ever followed drinking fresh water in quantities insufficient to repay the water debt. The urine output was raised above the basic level of 350–450 c.cm. per day by an amount which was not, on the average, found to exceed the volume of the ingested saline or sea-water. In the first part of expt. 2, the average urine output was 534 c.cm. per day; in the control group, having the same diet, leading the same life, and drinking the same amount of fresh water but no sea-water, the average daily urine output was 412 c.cm. The diuresis did not in most cases equal in volume the volume of water that had been ingested as 3·5% saline or sea-water.

Table II summarises the results of expt. 4; in addition to the changes in the urinary excretions it also shows the blood changes. In this experiment 400 c.cm. of sea-water was drunk daily, at first with 240 c.cm. of fresh water, and later with no fresh water; because of this greater intake the diuresis was greater than in the other experiments. In all experiments the ingested chloride was entirely excreted after the initial retention, without interfering with urea excretion. In experiments 2 and 3 the total daily urea excretion was slightly greater than that of the control subjects not drinking sea-water but with the same limited intake of fresh water. Changes in the urea excretion were reflected by changes in the blood-urea. In expts. 1 and 2, when there was a relatively high fresh water intake with 180 c.cm. of sea-water per day, the blood-urea remained at a relatively low level. In the second period of expt. 2b and in expt. 3 the sea-water intake was still 180 c.cm. per day, but the fresh water was only 60 c.cm. per day; in these subjects the blood-urea rose, but less than in the control subjects. In expt. 4, with 400 c.cm. of sea-water daily, there was a fall in the blood-urea to the normal figure (see figure, curve B). The final effect, therefore, of the diuresis varies with the level of fresh water intake and the amount of sea-water taken; this point is further discussed below.

Body-weight.—The rate of weight loss was not much affected by drinking sea-water. The average weight loss of the subjects in expts. 2a and 2b, when they were drinking 540 c.cm. of fresh water and 180 c.cm. of sea-water per day, was the same as that of the subjects in the control group who had the same fresh water but no sea-water. In the second part of expts. 2b and 3, the daily fresh water intake was only 60 c.cm. but there was a sea-water supplement of 180 c.cm. per day; these subjects lost during the whole 4-day period an average of 3·90% of the initial body-weight for the 4-day period, while the average weight loss for the control subjects was 4·54%. In expt. 1, subject 1 was drinking 240 c.cm. of fresh water and 180 c.cm. of 3·5% sodium chloride each day; his rate of weight-loss in the experiment was definitely less than in a previous experiment when he drank the same amount of fresh water, ate substantially the same diet, but had no sea-water. No comparisons were available for expt. 4, but the body-weight curves of both subjects showed definite fluctuations at the time of the change from 370 c.cm. of fresh water daily to 240 c.cm. of fresh water with 400 c.cm. of sea-water; these fluctuations suggested a diminished rate of weight-loss when sea-water was drunk. No further discussion on this point is necessary.

DISCUSSION

From these experiments several important points emerge. The first is that the man on the raft, on the shipwreck diet, when he is not drinking sea-water is in negative chloride balance. If and when he begins to drink salt water, chloride is retained until the amount of chloride previously lost is made good. The initial loss of chloride from the body must result in an absolute salt deficiency; but, relative to the fluid content of the body, there is no actual salt deficiency during water deprivation. This is shown by the increase in the concentration of the sodium in the serum (my own observations; unpublished observations by McCance, 1943; Russel Elkinton and Taffel (1942), which indicates a general rise in the body osmotic pressure. Sodium chloride loss is generally associated with a loss of extracellular fluid. Wiley and Wiley (1933) from observations on the sodium and potassium losses in the urine deduced that the water lost early in water-deprivation is from extracellular sources, and that that lost later is mostly intracellular in origin. Russel Elkinton and Taffel fasted dogs completely (neither food nor water) for 12 days, making full metabolic studies. They confirmed on dogs Wiley and Wiley's observation on men, and also showed that the potassium losses were greater than the amount that would be made available from the tissue breakdown as indicated by nitrogen excretion. They calculated that more intracellular water was lost than could be accounted for osmotically and from tissue breakdown; it was found that 30–55% of the original intracellular water was lost, compared with only 20–38% of the extracellular water. They suggest that the tendency is for the body to conserve its extracellular fluid at the expense of the intracellular.

The restoration of the total sodium-chloride content of the body to its pre-experimental level seen in the present experiments may have been another manifestation of the same tendency. This relative retention of chlorides will give rise to an increase of osmotic pressure in the extracellular fluid. In consequence, water is immediately drawn out of the cells to restore the osmotic balance and thereby replenishes the depleted extracellular reservoir at the expense of the intracellular fluid. This must occur, but whether it is part of a protective mechanism or only a coincidence it is not possible to say from the present evidence.

The amount of sea-water allowed was calculated on the assumptions, first, that at low levels of intake at least 66% of the water ingested as sea-water is excreted as

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urine additional to the basic output of 400 c.cm. per day; and second, that all the urine excreted under such circumstances can carry the maximum concentration of sodium chloride, that is, 2% (Davies et al. 1922). If x c.cm. of sea water are drunk or otherwise ingested the sodium chloride intake will be $35x$ mg.; the urine output will be $(400 + 0{\cdot}66x)$ c.cm. If there is to be no salt-retention then chloride output must equal chloride intake; if the urine contains the maximum amount of sodium chloride then at chloride balance

$$35x = (400 + 0{\cdot}66x)20$$

This gives an approximate value for x of 400. In practice it was found that with 400 c.cm. of sea-water per day more than 66% of its water content was lost in the urine. The maximum concentration of sodium chloride in the urine observed by Davies and his colleagues was confirmed; in experiment 4 the maximum chloride concentration in the urine of subject 2 was 2·00% and in the urine of subject 1, 2·30% of sodium chloride.

No references have been found in the literature to the physiological effects of drinking sea-water but the effect of rectal instillation has been examined in some detail. Experiments have been reported by Foy, Altmann and Kondi (1942) on this subject, and Bradish and his colleagues (1942) followed the effect of instillation of sea-water not only into the rectum but also up into the colon. The former workers gave repeated sea-water enemas to three subjects in the course of 80 hours during which they were deprived of water; on the first day as much as 1300 c.cm. were given, on the other days four enemas of 200 c.cm. each; a control group had no sea-water enemas and was totally deprived of water for the same period. In the sea-water group there was a 50% greater weight loss, less hæmoconcentration (the authors considered the hæmoconcentration the same in both groups, but the figures suggest otherwise), and—except for one man who had a gross rise—only a slightly greater rise in blood-chloride concentration. The latter workers, after "a condition of water deprivation was established" instilled 600 c.cm of sea-water into the rectum and colon of normal subjects and into the colon of a patient with a colostomy; in all subjects weight-loss was increased. In the patient, samples recovered from the colon at intervals showed a progressive dilution, and not all the chloride could be recovered at the end of the experiment. The conclusion was arrived at that the sea-water became diluted by osmotic absorption of body fluid, and that chloride was absorbed. Both groups of workers agree that sea-water per rectum during water deprivation accelerates the weight-loss, and increases the osmotic pressure of the body fluids because of chloride absorption.

In both the above investigations large volumes of sea-water were used over a short period; if smaller amounts had been used it is probable that different results would have been obtained. The kidney cannot excrete on an average more than 2% sodium chloride. Hence, if all the chloride is absorbed from the gut, and there is to be no chloride retained in the body, the volume of urine to be excreted must be at least 1·75 times the volume of sea-water ingested, taking sea-water as containing 3·5% sodium chloride. Therefore if 400 c.cm. of sea-water are absorbed per day the urine volume must be 700 c.cm., that is, 300 c.cm. above the basic urine level and giving a gain of 100 c.cm. of water; but with 800 c.cm. the urine volume must be at least 1400 c.cm., 1000 c.cm. above the basic level thereby resulting in a loss of 200 c.cm. of body water if all the salt is to be excreted. These calculations cannot be applied to the reported work on rectal instillation as the amounts absorbed were not recorded by these workers.

In regard to nitrogen-retention there are three different conditions to be discussed: complete deprivation of water; partial deprivation of water; and the ingestion of sea-water with or without small quantities of fresh water.

During complete water-deprivation the total volume of body fluid is decreased, hence unless urea excretion is increased the concentration of urea in the body will rise. In addition the man on the raft is on a low calorie diet, so he has an increased tissue breakdown and increased urea production. Unless the clearance of urea increases therefore the urea concentration will rise. The total clearance depends on the concentration of urea in the urine; this is governed by the urea concentration in the plasma. As the concentration in the body fluids, and hence in the plasma, rises the concentration in the urine also rises, so that the ratio between urine-urea and plasma-urea concentrations (the U/P ratio) remains about the same. In this way the rate of rise in concentration of urea in the body fluids is kept in check and the concentration itself, as reflected by the plasma-urea rises only slowly. When, however, the ceiling concentration for urea in the urine is reached, further rises in plasma-urea concentration can no longer be followed by rises in urine-urea concentration; the U/P ratio falls but the urine volume is unchanged and so the plasma clearance is diminished and the concentration of urea in the body then rises more rapidly (see figure, curve A).

When only a little water is drunk, the drain on the body fluids is diminished, therefore the potential rise in the urea concentration of the body fluids is less. The amount of urea that has to be excreted in order to prevent this rise in concentration is correspondingly smaller, and this level of excretion can be achieved at a concentration of urea in the urine at or below the ceiling. This urea concentration is attained with a normal U/P ratio and only a slightly raised level of urea in the plasma; the plasma-urea remains steady at this slightly increased level (see figure, curve B).

When sea-water alone is drunk the urine volume rises; if the U/P ratio remains high the clearance is increased. With 180 c.cm. of sea-water daily and very small quantities of fresh water (expt. 2b and expt. 3) the blood-urea still rose, though the average urea output per day was 1 g. greater than in the control group who had no sea-water. This difference in output was reflected by the lower blood-urea levels in the subjects drinking sea-water. With 400 c.cm. of sea-water and 240 c.cm. of fresh water per day the increased urine output permitted such a good clearance that a raised blood-urea was brought back to the pre-experimental level; and when the fresh water was discontinued there was only a slight increase in the blood-urea (see figure, curve B). Drinking sea-water, therefore, in these quantities diminishes or prevents nitrogen retention and possibly to this extent may benefit the man on the raft.

SUMMARY

The effects of drinking up to 400 c.cm. of sea-water daily, when either totally or partially deprived of fresh water, and on the low-calorie and low-salt diet of the "man on the raft" may be summarised as follows:

An increase in urine output, with an improved total urea-clearance;

A slight gain to the body of water, because the extra water lost in the urine is less than the extra water ingested as sea-water;

An initial retention of chloride equal to the chloride lost before beginning to drink the sea-water; and subsequently full excretion of all the chloride ingested.

I wish to thank the Medical Director-General of the Navy for permission to carry out the large scale experiments at a Royal Naval Hospital, and the Surgeon Rear-Admiral commanding the hospital for the facilities extended to me there. I wish to express appreciation to the subjects who voluntarily underwent the rigorous conditions of the experiments, and to the laboratory and clinical staff without whose help much would have been left undone. I must also thank Dr. B. S. Platt and Dr. E. A. Carmichael for their encouragement.

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LCC NURSERIES.—During the past year admissions to the Council's four London nurseries have nearly doubled and at present over 70 babies a week are being admitted. It is no longer possible to send enough children to short-stay nurseries in the reception areas to keep vacant cots in London for day-to-day needs. The Council is therefore opening a new nursery in Maitland Park Road, N.W.3, which will accommodate 36 babies.

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PNEUMONITIS ASSOCIATED WITH AUTOHÆMAGGLUTINATION *

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WHILE investigating a case of fever, we observed that, when a drop of blood was placed on a slide, the red corpuscles immediately separated into clumps. Furthermore, when an attempt was made to count them, they were agglutinated in the diluting chamber of the hæmocytometer pipette. In this patient, apart from the fever, the only clinical findings were moist sounds at the bases of the lungs. His illness appeared similar to that of other patients with fever and cough then under our care. Their blood was accordingly examined, and was found to show clumping of red cells in varying degree. An investigation in the medical wards led to the recognition of a group of cases in which the predominant clinical features, all of gradual onset, were fever and cough, the latter often associated with vomiting, hoarseness of voice, and the presence of fine crepitations in the lungs: all showed the phenomenon of agglutination of red corpuscles.

The following observations are based on 54 consecutive cases of this form of pneumonitis, of which 50 came from two companies of the Royal Indian Army Service Corps, which had recently arrived from India together, and the remaining 4 were in other RIASC sepoys, who had had an opportunity to mix with these companies at the nearby training centre. The men had been recruited six months previously in the Delhi-Meerut-Lucknow area. They had been in camp near Delhi, where the incidence of fresh malarial attacks was high, and some of them were still suffering from the effects of this disease. Admissions with symptoms attributable to pneumonitis began shortly after arrival in the Middle East:—

Weeks after arrival	1	2	3	4	5	6	7
Cases admitted	4	10	8	13	5	9	5

The principal incidence was in December, when the nights were cold, the days warm and sunny and the atmosphere dry. There was no unusual incidence of catarrhal infections of the respiratory tract either in these two companies or among other Indian troops in the locality.

CLINICAL FEATURES

The cases may conveniently be divided into four groups: (i) atypical pneumonia; (ii) short fever with cough and persistent lung signs; (iii) afebrile laryngitis with little or no lung involvement; and (iv) proved malaria or splenomegaly with laryngeal or lung affection.

Group I.—The 13 sepoys in this group had a severe febrile illness lasting six days or more.

The fever usually exhibited a daily swing from normal to as high as 104° F. In 7 patients, after the initial bout of fever, there was a relapse which in some cases was more severe than the original attack. In 2 patients there were repeated relapses, and they were febrile for 31 and 46 days. Sulphapyridine was given in 7 cases; in 2 the fever was completely suppressed and in the remaining 5 there was partial suppression followed by recrudescence on withdrawal of the drug. Cough was persistent and was associated with vomiting in 5 cases. Laryngitis was conspicuous in 6. Dyspnœa out of all proportion to the physical signs in the lungs was noted in 3 cases, but in only 1 of these was there cyanosis. The nasopharynx was congested in 2 cases only.

The most frequent findings in the lungs were fine moist sounds, usually at the bases and axillæ but sometimes in other localities such as the sub-apex. These crepitations sometimes persisted as long as three weeks after the fever had subsided. The percussion note was impaired over the affected areas but there was never bronchial breathing or other evidence of classical consolidation. The sputum was characteristically copious, frothy, and mucopurulent with occasional flecks of blood. All these patients were radiographed by Major G. A. Maddocks, RAMC, and in 9 of them the X-ray appearances indicated parenchymatous lesions in the lungs, more extensive than the physical signs suggested.

No skin rashes were observed and no enlargement of lymph-glands. Neurological features were absent and the cardiovascular system was little affected. The urine contained no albumin or sugar and negligible deposits. The liver was not enlarged, and though the spleen was moderately enlarged in 3 cases, it was hard, and its condition could be attributed to previous malarial infection. Repeated blood smears failed to reveal malarial parasites or spirochætes. All the patients recovered and were sent to a convalescent depot after 4–10 weeks in hospital.

At the time these patients were in hospital, the only laboratory equipment immediately available was a microscope and a hæmocytometer; so specimens for bacteriological examination had to be sent several miles to a laboratory already busy with other routine work. Blood cultures (in 8 cases) were sterile; sputum cultures (3 cases) showed no constant or significant organism; and lung puncture (3 cases) yielded no pathogens. The Weil-Felix reaction was negative with OX19, OXK and OX2 antigens in 8 cases. The Kahn was negative in 5 patients tested.

Of the 13 patients 9 showed a leucocytosis, which varied from 12,000 to 61,000. The polymorphs never exceeded 88%, but there was a well-marked shift to the left and in 2 cases definite myelocytes were seen in the peripheral blood. In 5 of the patients there was a mononucleosis, which in one case was as high as 16% of 22,000 cells. In another man there was a notable lymphocytosis. Thus the differential blood-picture was by no means uniform.

Autohæmagglutination was exceptionally rapid in 3 of the cases. In 2 it was initially impossible to do a blood-count. In the third an independent observer, in the course of routine blood-grouping, reported complete agglutination on the wire loop which he was employing to transfer blood from the finger to the serum.

Group II.—This group comprises 15 sepoys with a mild febrile illness of less than six days.

All showed cough and basal crepitations and in some instances these persisted a fortnight after the fever subsided. In 7 cases there was laryngitis, and in 6 vomiting with the cough. Sputum resembled that in group I. The nasopharynx was congested in only 2 cases; there were no positive X-ray findings. The spleen was enlarged and hard in 6 patients, but blood examination revealed no malarial parasites or spirochætes. In 5 there was a mild leucocytosis.

Group III.—In this group we include 12 cases of laryngitis. They were afebrile in hospital but 9 gave a history of fever just before admission.

Only 2 showed any congestion or œdema of the pharynx but in 7 a few crepitations were found at the bases of the lungs. All 12 patients had cough and 5 had vomiting. Capt. Sanjiva Rao, IMS, who kindly examined several of the patients, reported some œdema and congestion of the larynx but no ulceration. The laryngitis usually persisted for 2–3 weeks. In 6 cases there was a hard palpable spleen, but again no blood parasites were found.

Group IV.—The remaining 14 patients comprise 9 in whom malarial parasites were found in the blood and 5 in whom the spleen was much enlarged.

All of them presented respiratory features: 13 had persistent crepitations in the lungs, not necessarily basal, and 6 had laryngitis; rhonchi was noted in 4 cases only. The throat was innocuous in all. The fever was variable and responded to quinine, although in 3 instances there was a short recrudescence of pyrexia on withdrawal of the drug.

AUTOHÆMAGGLUTINATION

Autohæmagglutination is defined by Boxwell and Bigger (1931) as "a clumping of erythrocytes into irregular masses, visible to the naked eye, occurring in the presence of the individual's own serum, without bacterial action, at air temperature, and reversible at body temperature." In this paper we restrict the term to the separation, within two minutes and in the midst of a clear plasma, of clumps of erythrocytes, readily visible to the naked eye. No incubator was

* This paper, dated Feb. 8, 1943, reached us at the beginning of July, when we had already published the observations of Lieut.-Colonel J. C. Turner and his colleagues on the Relation of Cold Agglutinins to Atypical Pneumonia (*Lancet*, 1943, i, 765, 779). To facilitate early publication it has been much abridged.—ED. L.

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available to study the critical temperature at which this change occurred, but there seems little reason to doubt that it was at or about body temperature.

To determine whether the agglutination was due to a peculiarity of the red cells or of the serum, in 30 cases serum and cells were separated and the former tested against accredited O (IV) corpuscles. On every occasion agglutination took place. Two sera were tested and found to agglutinate rabbit and sheep cells in addition. It can therefore be assumed that in our series the phenomenon was attributable to the presence of a non-specific agglutinin in the sera, capable of agglutinating any red corpuscles. Coincidently with the clinical improvement, the rate of agglutination and the size of the aggregates were gradually diminished. On discharge from hospital the majority of the patients still showed some pathological clumping, but in about a third it no longer occurred.

A study of the available literature showed that autohæmagglutination was reputed to be rare. It has been reported in a variety of diseases—notably affections of the liver and spleen, severe anæmias and chronic sepsis—and occasionally in normal people (Boxwell and Bigger 1931, Whitby 1942). The only disease in which autohæmagglutination is claimed to be almost constant is trypanosomiasis and Yorke (1911) found it in animals with trypanosome infection. Manson-Bahr (1935) states that it is often noted in kala-azar.

We have sought for autohæmagglutination in 331 sepoys other than those with pneumonitis, and the results are summarised in the accompanying table. In the cases recorded as positive, the agglutination was similar to that seen in the pneumonitis series but it was seldom so coarse or so rapid. We have not seen more than a fine granularity in the blood of a healthy person, and apart from the afebrile members of our series, we have not found agglutination except in patients suffering from some serious ailment, usually of an infective nature. In these the phenomenon appears to be by no means uncommon, which is not altogether unexpected since in these diseases the erythrocyte sedimentation-

INCIDENCE OF AUTOHÆMAGGLUTINATION IN 331 SEPOYS

—	Number tested	Autohæm-agglutination present
Chronic malaria (splenomegaly, malarial anæmia and febrile relapses)	37	20
Miscellaneous, acute and chronic respiratory infections	41	2
Tuberculosis {pulmonary	46	19
Tuberculosis {non-pulmonary	5	2
Infective hepatitis	8	2
Nephritis	3	1*
Leprosy {nodular	1	1
Leprosy {anæsthetic	5	0
Severe battle casualties	35	7†
Miscellaneous non-septic surgical	42	0
„ afebrile medical	48	0
Healthy sepoys	60	0

* Severely anæmic. † All with chronic sepsis.

rate is often accelerated. The high incidence in cases of chronic malaria is interesting and suggests further inquiry.

DISCUSSION

There can be no question that the illness attacking our 54 patients was an infection, usually involving the parenchyma of the lung. It is reasonable to describe the disease as a pneumonitis and to regard the cases as a graduated series, at one end of which the lung features were so mild that no clinical signs were observed after admission of the patients to hospital. Indeed, these latter cases may be considered a *forme fruste* of the infection.

Pneumonitis or atypical pneumonia is, in our experience, not at all uncommon among Indian troops in the Middle East, but we have never previously seen so many cases in one unit within so short a time. In an annotation on the rickettsias, the *Lancet* (1941) states that "recent observations suggest that many rickettsial infections involve the lungs, setting up a pneumonitis or interstitial pneumonia," and it is therefore relevant that all the patients examined were heavily infested with lice, as indeed were all the men in the two companies involved. The association of chronic malaria with so many of the cases must suggest the possibility of a malarial basis for the disease, but an outbreak of malarial pneumonitis is outside all previous experience. In these circumstances the nature of the infective agent, with its peculiar affinity for the lungs and the larynx, remains a matter for speculation.

SUMMARY

An outbreak of pneumonitis in an Indian unit is described. Autohæmagglutination was found in all 54 cases.

Our thanks are due to Lieut.-Colonel P. A. Dargan, IMS, for permission to publish this paper and to Jemadar M. Bhattacharya, IMD, for his assistance.

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URINARY TRACT INFECTIONS IN THE ROYAL NAVY

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IMPRESSIONS of the incidence of given diseases in the Forces in war-time as compared with their incidence in normal civilian practice are apt to be ill-founded, because a picked and normally healthy population of a particular age-group is under observation. Only members of the same branch of the Service in the prewar years can offer a true basis of comparison; and using these as controls it is also possible to assess the influence of war conditions on the trend of a disorder. In a review of ailments in naval personnel admitted into an EMS hospital in 1942, urinary infections seemed surprisingly prominent. It was possible to confirm this impression by comparison with data in the Statistical Report of the Health of the Royal Navy for past years. The year 1935 was chosen merely because it is relatively recent.

At that time the Navy carried a force of 86,343, and the number of cases in the sick-list was 37,963. Infections of the urinary tract grouped under various headings—cystitis (60), pyelitis (39), bacilluria (12), pyonephrosis (3), trigonitis (1), pyuria (1)—formed a total of 116 cases; this works out at about 3 per 1000 of sick cases, and 1·34 per 1000 of total strength. The number of Naval admissions in 1942 into the EMS hospital was 5093, and of these, 172 were found to be suffering from an infection of the urinary tract—an average of 33·75 per 1000 admissions, or more than 11 times the prewar incidence.

It is interesting to contrast the figures of the Royal Air Force (Rook 1938). Between the years 1926 and 1936, the yearly average was 1 case of pyelitis or cystitis per 1000 strength. Rook divided his series into two groups according to whether the affected person was stationed in the United Kingdom or serving abroad: the incidence in the latter was 1·7 cases per 1000, and in the former 0·7; so that service abroad seems to be an important ætiological factor. A further deduction which can safely be drawn from the relative small difference between prewar incidence in the RAF and in the Navy is that conditions in the Navy in peace-time do not favour any increase of infections of the urinary tract: the great increase encountered can only be attributed to the abnormal conditions of war.

Of the 5093 admissions to the EMS hospital, 485 were officers, 213 WRNS and 4395 ratings; and among these, 11, 18 and 143 cases of urinary infection were found. An incidence of 84·5 per 1000 sick cases is obtained for the WRNS, but this cannot be regarded as having weighted the average figure unduly, for even when the female section is excluded, the rate works out at about 32 cases per 1000. No parallel figures are avail-

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able to show the trend of urinary infections in the WRNS as compared with those in the female adult population of peace-time.

The onset was nearly always acute, with malaise, anorexia and general aching of the body, so that often the diagnosis was mistaken. Pyrexia was commonly present, lasting as a rule only two or three days. A history of rigor was obtained in only a few instances, but the patients often complained of feeling cold and shivery. Gastro-intestinal symptoms were not conspicuous, though there were diarrhœa and nausea in a few cases; constipation was not more prominent than in other admissions to hospital. Frequency of micturition was by far the commonest symptom, and definitely indicated the diagnosis; but the patient seldom volunteered information about frequency spontaneously, and direct questioning was necessary. Pain, when present, was situated over one or more of the recognised sites—the lumbar region posteriorly, along the lines of the ureters, the hypogastrium, and along the urethra during micturition. In nearly all cases tenderness was found over some area of the genito-urinary tract, even when spontaneous pain was absent. All cases recovered, and no complications were encountered if one excludes acute non-specific epididymo-orchitis, seen in 8 patients. It is debatable whether this condition can definitely be ascribed to the urinary infection, since in some cases of the kind no urinary infection or other ætiological agent could be demonstrated.

The first 100 cases of urinary infections were compared, as regards previous attacks of gonorrhœa, with a similar number of consecutive admissions to the medical wards at various periods of the year; no evidence was found to suggest that gonococcal infection bore any definite relation to the malady. Urinary infection developed in some patients while they were being treated in the wards for some other condition.

Symptomatology in the WRNS differed somewhat from that among the men; the onset was more insidious, systemic reactions were not pronounced and the stay in hospital was longer. The attack was the first in nearly all the men, but among the WRNS a history of a previous bout was not uncommon. In 172 cases the incidence of various symptoms was as follows: frequency of micturition 130; backache 62; pain in right loin 36; pain in left loin 30; pain in hypogastrium 15; painful micturition 35.

In 56 cases another malady coexisted, but there was no significant correlation with any particular disease. The associated conditions were: anxiety state 9; bronchitis 5; cellulitis of ear 1; duodenal ulcer 3; dysentery 1; epididymo-orchitis 8; gastritis 5; glandular fever 2; gonococcal arthritis 1; hæmorrhoids 1; hyperpiesia 1; infective hepatitis 2; malaria 2; nephrectomy 1; papilloma of bladder 1; pregnancy 1; prostatitis 1; renal calulus 5; and tabes dorsalis 1.

To assess the possible influence of seasonal variations on the incidence of urinary infections in this series, it would be necessary to know the weather conditions prevailing at sea or port of debarkation at the time of onset. This information could not be collected but the number of cases admitted to hospital in each month of the year are noted in table I. It will be seen that there is a fairly even distribution throughout the twelve months.

TABLE I—CASES OF URINARY INFECTION ADMITTED IN EACH MONTH OF 1942

	Cases		Cases		Cases		Cases
Jan.	8	April	12	July	17	Oct.	19
Feb.	15	May	16	Aug.	14	Nov.	13
March	13	June	18	Sept.	10	Dec.	17

The largest number of cases fell within the 20–30 decade (table II), but this may merely reflect the larger number of personnel of this age-group at present serving in the Navy.

TABLE II—AGE-GROUPS OF PATIENTS WITH URINARY INFECTION

Age (years)	Ratings	WRNS	Officers
17–20	18	7	1
20–30	68	9	6
30–40	39	2	2
40–50	18	0	2

Hammond (1935) considers that, with men, a catheter specimen of urine is unnecessary for bacteriological examination. Midstream specimens of urine were therefore regarded as satisfactory from men, while women were catheterised. A few staphylococci or coliform organisms were taken to be due to contamination, but when any doubt existed, a catheter was passed. By far the most common offending organism was *Bacillus coli*. No attempt was made to classify the coliform bacilli into the groups suggested by Hill, Seidman, Stadmichenko and Ellis (1929). Staphylococci were found in very few cases, and these were nearly all WRNS. *Streptococcus fæcalis* was the sole infecting organism in 28, while a mixed infection of *S. fæcalis* and *B. coli* was found in 19. In several patients the flora of the urine was seen to change during treatment from *B. coli* to *S. fæcalis*, or vice versa.

Microscopy of urinary sediment revealed a variable number of pus cells, and in men spermatozoa were not uncommon. Cells derived from the lining of the urinary tract were often seen. Albuminuria was present in some 50 cases, but was rarely considerable, and only persisted for a few days. Frank hæmaturia was found in 16 cases, and even when the results of chemical tests for blood were negative, a few red cells were often reported on microscopy. The sediment was usually mucopurulent, but only during the first few days. An offensive urinary odour was rare.

Treatment was by rest in bed, forced fluids and a citrate and bicarbonate alkaline mixture, given at two-hourly intervals until the reaction of the urine was alkaline, and then reduced to four-hourly dosage. Results were good and the urine was usually sterile within two weeks. Rest in bed and the large intake of fluid were probably the important factors, and contributed to the good results. Subjective symptoms disappeared within 3–4 days. A small number of cases were resistant; the usual course then was to give ammonium chloride in sufficient dosage to render the urine acid, and a hexamine mixture. If these failed, a return to alkaline therapy nearly always succeeded. Mandelic acid preparations were also efficacious. The value of sulphonamides in urinary infections has become firmly established; they were not often employed in this series and no attempts at comparison of their efficacy were made. Infections in WRNS were more resistant to treatment of all types, and required a longer stay in hospital than infections in men.

DISCUSSION

The mode of invasion of the urinary tract by infection is still unsettled. The three routes—hæmatogenous, lymphatic and ascending—all have their protagonists. A noteworthy feature in this series was the sharp onset with fairly severe constitutional disturbance, suggesting a systemic infection or toxæmia. No blood-cultures were examined to establish the possibility of a blood-borne infection, but it is now generally accepted that in so-called normal subjects organisms periodically gain access to the blood. These organisms may be destroyed in the blood-stream, but if not, the kidneys offer the natural channel for their elimination, and this is the course of events surmised by many in the ætiology of pyelitis. The urethra offers a site from which, after but slight trauma, organisms are rapidly absorbed into the blood. The question of masturbation and the resulting injury of the urethra, the proximity of the rectum, contamination of the fingers and the lack of preputial toilet forms an interesting chain of circumstantial evidence. Even the change of type of infecting organism seen in several of the cases could be explained by a subsequent bacteræmia. It may be argued, however, that the inflammatory swelling and spasm of the ureters partially obstruct the urinary flow, and account for the generalised symptoms at the onset of the illness. Furthermore Helmholtz (1937) has shown that injection of *B. coli* into the blood-stream, even when the kidney has been damaged, does not necessarily produce urinary infection. It is also difficult to explain cases of septicæmia from organisms other than those usually isolated from infections of the urinary tract; in these a true inflammation of the tract does not occur; does the nephron exert any selective action in the elimination of different types of bacteria?

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Rook refers to the experiments of MacKenzie and Wallace (1935) who injected dyes into the lower parts of the urinary tract. It was found that in every case the dye passed to the lymphatic chains running up along the aorta, and in no instance could the dye be found passing up the ureteral wall or the peri-ureteral lymphatics. The lymphatic route, however, may operate indirectly, conducting the organisms to the blood, and thence arriving at the kidney.

The greater liability of women to these affections is in favour of ascending infection, and has been explained in terms of the shorter length of the female urethra. Men were asked their own views of contributing factors. Some mentioned that owing to the special nature of their duties they were only able to empty their bladder at long intervals; and strenuous work might have to be done with the bladder distended. This would increase intravesical pressure, and possibly have secondary effects upon the ureters. Stagnation may also play its part. Learmonth (1937) considers that ascending infection by way of the ureter is the most probable hypothesis.

Hammond points out that whatever route the organisms travel along, they always seem to come from the intestines, and he stresses the importance of the hyposthenic constitution. Coli infections, he says, are not common in strong and robust people, and when they do occur, there is some lowering of vitality through long physical or mental fatigue. I have been struck by the tired and anxious appearance of many of the men admitted during the year under survey, and have noticed how quickly their general health responds to rest in hospital. It may be that this state of fatigue predisposes to infection. The urinary tract was fully investigated in only a few cases, but it is unlikely that organic disease of this system was present in large numbers of these patients, all of whom had previously been healthy and recovered quickly from their illness.

SUMMARY

Infections of the urinary tract in the Royal Navy are common.

Men of age-groups (20–30) not ordinarily considered liable to this disease formed the bulk of the cases reported here.

The onset was acute, with constitutional upset lasting a few days, and cure followed simple therapy, usually within two weeks.

No complications were recorded, no definite ætiology was ascertained and no prophylaxis can be advocated except avoidance of over-distension of the bladder.

Coliform organisms were isolated from the urine in most instances.

Age and the particular season of the year in this country did not appear to have any influence on the incidence.

I have to thank Temporary Surgeon Rear-Admiral J. W. McNee, Dr. J. A. Wilson and Dr. A. M. Scott for their kind help, my surgical colleagues for access to their case-records, and the Medical Director-General of the Navy for permission to publish this paper.

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Reviews of Books

Queen Charlotte's Textbook of Obstetrics

(6th ed.) By the members of the clinical staff of the hospital. (Churchill. Pp. 577. 25*s*.)

THE new edition of this popular textbook is arranged like its predecessors. It has been altered, however, to bring the text into line with modern methods, and a small section has been added on postnatal care. The clinical staff of the hospital, with four specialists in subjects allied to clinical obstetrics, have presented in a clear and readable form the current practices of our senior lying-in hospital. The section on development is notably good, and that on puerperal pyrexia should be read especially by those responsible for institutional midwifery. Early rotation of complicated occipito-posterior cases is advised, but it is perhaps disappointing that the authors do not consider this best achieved by seeking the posterior shoulder and leaving the head to look after itself. Compression of the fœtal head during repeated attempts to rotate a difficult case may be harmful, but manipulation of the shoulder involves no such danger. The view that the breech with extended legs has a worse prognosis than the other varieties will not be universally accepted. The section on the pelvis perhaps emphasises too much the average measurements without mentioning the equally important standard deviations. The section on forceps is not well illustrated. Apart from such minor shortcomings, the book contains all the information that the medical student and recent graduate require for a sound working knowledge of obstetrics.

Synopsis of Surgical Anatomy

(5th ed.) ALEXANDER LEE MCGREGOR, M CH EDIN., FRCS. (Wright. Pp. 710. 25*s*).

THE few minor changes which have been made in this book since it first appeared speak well for its conception and execution. Developments of surgery requiring extensive knowledge of anatomy have caused Mr. McGregor to add a full account of the latest views on the anatomy and physiology of the automonic nervous system. In this field the anatomist and physiologist have followed the experimental surgeon. The author has extracted the essentials of Codman's work on the shoulder, and ably described the anatomy of the various injuries of this region, using his own cases to illustrate clinical points. These two sections, with a short and rather incomplete account of the anatomy and pathology of the intervertebral disc, comprise the main additions. The excellent diagrams are still a feature of the book, which though not for the tyro (being written in tabulated form) should certainly form part of the library of the candidate for higher degrees and of the professional surgeon.

Annual Review of Physiology

Editors: J. M. LUCK, V. E. HALL, Stanford University. (Lewis. Pp. 613. 31*s*. 6*d*.)

WE commend the decision of C. V. Taylor, one of the contributors to this annual digest of new knowledge, "to find a theme which might not only represent some present research trends but also help tie together the reviewed accounts, even at the risk of some serious omissions." The reviews written in this way, as in previous volumes, make better reading than the other contributions, but they are all valuable, and the editors may well be thanked for maintaining this service to medical science in spite of the increasing difficulty of obtaining journals and contributors from abroad. The growing tendency of reviewers to write in a readable and explanatory way is satisfying, and the editors show no signs of stereotyping their table of contents. Subjects earning for the first time an article to themselves are the physiology of bone, nerve and synaptic transmission, and biological assay.

Ambulance Hand Book

(14th ed.) E. G. GERSTENBERG, FRCSE, FRFPSG; J. B. GAYLOR, FRFPSG, W. C. GUNN, MD. (St. Andrew's Ambulance Association. Pp. 432. 2*s*. 6*d*.)

THIS book on the principles of first-aid to the injured has reached the impressive total of 14 editions since 1933, and its popularity is justified. No concession is made to the relatively illiterate, and the style is reminiscent of the rolling periods of Sir Walter Scott. The preface says: "St. Andrew's Ambulance Association still adheres to the principle that in order to practise ambulance work, a knowledge of the human frame and of the nature of life is fundamental. For this reason anatomy and physiology are dealt with in considerable detail so that the advanced pupil may be able to understand the principles which govern the practice of first aid." The aim is fulfilled though with a greater use of anatomical and other technical terms than is usually found in first-aid books. The illustrations, especially the photographic plates, are very good.

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THE LANCET

LONDON: SATURDAY, OCTOBER 9, 1943

FATE OF SKIN HOMOPLASTS

GRAFTS from a patient's own skin, it is fairly generally agreed, will survive under favourable conditions to cover a denuded surface, while those from another person will not. Skin from a stranger will persist for a time, but finally and with few exceptions will be cast off. An explanation widely accepted is that the donor's epithelium is treated by the host as a foreign protein: it provokes an antibody which is able to destroy it. A regular exception to this rule is, significantly, the permanence of grafts between monozygotic twins. Similarity of blood antigen between recipient and donor, however, carries no assurance that a graft will be acceptable. The theory that the epithelium of another person gives rise to damaging or destructive antibodies in the plasma and fluids of the host is derived from serological and immunological knowledge in general. The possibility that blood and connective-tissue cells share in the rejection of foreign tissues and cells, either directly or through the intervention of opsonins, has never been excluded. The opportunity to test this second possibility has been seized by GIBSON and MEDAWAR [1] with the coöperation of a patient suffering from a large denuded burnt area of skin. The wounded area was put at rest, and kept suitably covered and bacteriologically clean; only *B. proteus* was ever grown from it. Transplantation on to the surface avoids almost entirely any foreign body reaction due solely to insolubility—such, for example, as fat and keratin are likely to provoke. There was some evidence of this kind of reaction but figs. 7 and 24 suggest that polymorphism of epithelial cells may have been mistaken for a foreign-body giant-cell reaction. Part of the denuded surface was grafted with autoplasts, part with homoplasts from a relative, and yet a third area with a second set of homoplasts from the same relative 15 days later. GIBSON and MEDAWAR then removed one graft with its bed from each of the first two sets at intervals of 5, 10, 15, 23, 31 and 36 days, for histological examination and comparison. According to expectation the autoplasts spread and became part of the new epithelial covering while the first set of homoplasts, after a good start which included vascularisation, began to degenerate between the 10th and 15th days, and by the 23rd day the epithelium was completely detached. In the second set of homoplasts, degeneration was complete by the 8th day after grafting—that is, simultaneously with the first set. Detailed cytological study revealed a quantitative but no qualitative difference between the local cell reaction of blood and mesenchyme cells. No evidence of epithelial destruction by phagocytosis was found. The first anatomical sign of rejection of the homoplasts was a separation at the dermo-epidermal junction in the donor's graft. This is the point where a separation in healthy skin is so difficult to achieve. By dissection it is almost impossible. It can be achieved by autolysis, by digestion for 24 hours in 1% acetic acid and very neatly at times by electric shock. Once the grafts had separated, the epithelium, which is parasitic upon the dermis, began to degenerate from the deepest cells progressively outwards, and was finally cast off. The fate of collagen in the graft was less certain. At a very late date it was found in one patient to have been phagocytosed in small globules. In another it appeared to fade away.

The simultaneous rejection of the first and second set of homoplasts, which had previously been observed by GIBSON in another case, provides one of the best pieces of evidence yet offered for the immunological explanation of failure of these grafts. It seems highly probable that the first set, grafted 15 days earlier, stimulated an antibody which was then available in the circulation to destroy the second at the same time. According to serological theory this antibody might be a lysin or variety of lysins; from the observations recorded, perhaps the dermo-epidermal junction is most readily, and collagen least readily, dissolved or broken up, thus accounting for the success of many corneal homografts. Only by following the progress of homoplasts by examination at frequent intervals from the earliest days can certain knowledge of their fate be obtained. Misleading impressions may otherwise arise. Even now many gaps in our knowledge remain and it is to be hoped that a few more human volunteers will be forthcoming to extend and confirm what has been found. It is important to know why more plasma cells, lymphocytes and polymorphs attend the homoplasts than the autoplasts; and whether, perhaps, these cells prepare the way for eventual ingestion of the collagen. MEDAWAR has discussed other problems in a practical article.[2]

Though multiplication of cells is assumed GIBSON and MEDAWAR make no reference to cell division. Whereabouts in the graft are mitoses to be found, if at all? Or is the whole spread due to migration of cells? If mitotic division occurs within the graft at a distance from its migrating edge, as in the case of a wound, was any support found for the suggestion of WIGGLESWORTH [3] that it was due to cell sparseness inside the expanding graft? Does the graft in fact function in just the same way as healing skin which has not been transplanted?

COUP AND CONTRECOUP

SURGEONS have long taken a keen interest in the effects of injury to the head and have tried to explain what they have observed during life and after death; but the variety of these explanations bears witness to their foundation upon supposition rather than fact. DENNY BROWN and RITCHIE RUSSELL have supplied accurate information about the results of certain forces applied to the head when fixed or free to move under experimental conditions; the purely physical study of the behaviour of the skull and brain during and immediately after a blow remains to be worked out. HOLBOURN, whose study of the mechanics of head injuries appears on another page, starts from the known physical properties of skull and brain; using models consisting of a gelatin "brain" inside a paraffin-wax "skull" he has analysed the forces

1. Gibson, T. and Medawar, P. B. *J. Anat.* 1943, 77, 299.

2. Medawar, P. B. *Bull. War Med.* 1943, 4, 1.
3. Wigglesworth, V. B. *J. exp. Biol.* 1937, 14, 364.

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which could result in cerebral injury. His main contention is that shearing strain—"the type of deformation which occurs in a pack of cards when it is deformed from a neat rectangular pile into an oblique-angled pile"—is the chief agent, and he proceeds to explain how this shear (or slide) may be developed in the brain as the result of blows upon the head.

Since the brain is incompressible, there is no appreciable relative movement between its parts as a result of linear acceleration; the notion that *coup* or *contrecoup* injuries are the result of alternate compression and rarefaction, due to free movement of the brain within the skull in the direction of the blow, must therefore be abandoned. A certain amount of shear may occur below the point of impact, particularly if the skull is broken, and this would account for *coup*. A much greater shear strain, however, develops as the result of rotation of the skull, and the fact that changes in rotational velocity are usually greater at the pole opposite to the point of impact would account for the more extensive injury of *contrecoup*. HOLBOURN'S observations do not abolish *contrecoup*, if the word is used to mean merely polar contusion; but they do refute the notion that polar contusion is caused by movement of the brain in a straight line till it bumps on the far side of the skull, since they show that *contrecoup* is really the result of shear due to rotational injury.

It should be recognised that almost all blows on the head rotate it, and the damage done to the brain depends on how firmly it is gripped by the meninges and internal conformation of the skull. An attractive feature of HOLBOURN'S presentation of the effects of shear is that it offers a clear mechanical explanation for the observations of DENNY BROWN and RITCHIE RUSSELL on cerebral concussion. Much remains to be discovered: what, for example, shear actually does to cerebral tissue; whether it affects cells or fibres or synapses; what it does to blood-vessels; and whether it can be a direct cause of contusion. Even as a simple extension of the experiments now described it would be important to know what happens when the forehead is struck, for we cannot accept the suggestion that, merely because rotation occurs in both cases, the effects are approximately the same as when the occiput is struck. Autopsies, of which there is unfortunately no lack, must not be neglected as a check upon laboratory experiments; for the damage done to the brain by a severe blow on the forehead is often most extensive at sites other than those affected by striking the back of the head.

WHAT KIND OF CORPORATION?

THE growth of public-utility corporations is one of the features of the twentieth-century British economic scene. In a timely review published in the last three issues of the *British Medical Journal* Mr. D. H. KITCHIN [1] points out that the public corporation or board embodies the principle that the best way to get a job done is to appoint capable and responsible people to do it and leave them as free as possible. The motive of successful and creative public service, he says, has proved quite as dynamic as the motive of private profit-making. This he considers not surprising, for much of the initiative and efficiency said to characterise private enterprise as opposed to official administration is provided by salaried workers who gain nothing material from their success.

An analysis of the constitutions of public corporations reveals two main types—those with boards built upon a representative basis, and those with appointed non-representative boards. Thus the Metropolitan Water Board is elected to represent the various local authorities concerned; the Port of London Authority is in part elected by ratepayers, wharfingers, and owners of river craft, and in part composed of appointed members representing the Admiralty, the Ministry of Transport, the London County Council, the City of London, and Trinity House; and the General Medical Council is partly elected by the profession and partly appointed to represent interested bodies. Two examples of non-representative boards are those of the British Broadcasting Corporation, appointed by the King in Council, and the London Passenger Transport Board, appointed by a group of trustees. Past experience has shown that where a board exists to perform functions that confer advantages on a number of bodies, there is much to be said for its being representative. If, however, its functions include the restriction of some bodies and the extension of others, for the common good, then a representative board is liable to find itself shot with dissension and reduced to impotence. In these circumstances, when a board is in effect a tribunal, its task is easier if it is non-representative.

Two types of corporate structure have been suggested for the national health service. Medical Planning Research [2] and now the British Medical Association [3] have proposed a national body, and the former specified that it should have a non-representative appointed board of governors, with representative advisory committees. In a special article a few months ago we put forward an alternative proposal for area corporate bodies, covering what we called health provinces.[4] These had governing councils representative of all hospital-owning authorities, health workers (including doctors) and local universities. If it wishes the medical services to be in the hands of corporate bodies, the profession will have to consider the relative merits of the different varieties—national and provincial, representative and appointed. Experience suggests that the structure should depend on the function they have to perform. We may suppose that a corporate health authority would have the following functions: first to employ doctors and their ancillaries (nurses, social workers, pharmacists, technicians, masseuses, dietitians, and hospital administrators), but not necessarily such personnel as clerks, porters, cooks, and cleaners; secondly to assess the health needs of the community and formulate plans to meet them; and thirdly to arrange that the plans are carried out. The chief means of securing execution of the plans would be to give or withhold financial grants for maintenance or extension: thus it would be necessary to reduce or even suppress the activities of some hospital-owning authorities, while increasing that of others. The first two functions—personnel and planning—could be performed equally well by elected representative bodies or by appointed non-

1. *Brit. med. J.* 1943, ii, 369, 399, 423.

2. *Lancet*, Nov. 21, 1942 (Suppl.). 3. *Ibid*, Oct. 2, 1943, p. 423. 4. *Ibid*, 1943, i, 813.

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representative bodies. But the ultimate success of a national health service will depend on the vigour with which the plans are executed. Once the question of suppression of redundant inefficient institutions arises, there is a danger that representative bodies will split into groups according to the interests they represent. For a national health service to become maximally efficient in a minimum of time, its governors should probably be an appointed national non-representative board. This argument, however, will not convert those who believe that in the long run democratic control at all levels gives greater efficiency than a more authoritarian machine.

'FLU VACCINES UP THE NOSE

FOR some years F. M. BURNET has pointed out the theoretical advantages of immunising against influenza by spraying an attenuated but still living virus up the nose. In general, where live virus vaccines can be safely given they are more effective than killed ones; moreover, in an emergency it would not be difficult to produce in a hurry a lot of influenza vaccine of the necessary type. In Australia attempts have been made to test intranasal 'flu vaccines in the field.[1] Influenza viruses of three different strains were attenuated by amniotic passage in chick embryos and were administered by a de Vilbiss atomiser, each subject receiving 0·25 c.cm. Antibodies to the three virus strains were estimated, before and after the vaccination, by the Hirst test (inhibition of the agglutination of fowl red cells). About half those inoculated showed a rise in antibody titre against one or other virus—on the whole rather a poorer result than subcutaneous vaccination with inactivated influenza virus has produced here and in America. But it is urged that a virus given up the nose may produce antibody rise only in those in whom it can gain a foothold, in other words only in those susceptible persons whom we want to immunise; we do not care whether or not antibodies increase in the others, who are immune anyway. In support of this seductive argument it is recorded that when vaccinated people who had shown a good antibody rise to an influenza B vaccine were revaccinated 3 to 6 months later very few showed any further rise. No epidemic occurred among them to put their immunity to a real test.

One argument against the use of live attenuated influenza vaccines is based on a fear that they might increase in virulence by passage from man to man. There was no evidence that this happened in the Australian trials, either in those conducted during an influenza season or in those after it; the trials involved "tens of thousands" of soldiers. Reactions produced by the intranasal vaccines were frequent but almost all slight, mostly amounting to slight headache, coryza or stuffiness for a day or two, not going on to the mucopurulent stage which so often follows a real cold. Among the soldiers no reactions were bad enough to interfere with training. It is suggested that these reactions were allergic, as they were commoner in those with an initially high antibody level than in those with a lower titre. They were also more in evidence after a second than after a primary vaccination; the possibility of sensitisation to the chick embryo fluids is not discussed.

There are virus-inactivating properties in human nasal secretions, and less certainly in tears, and these may have a great influence on liability to respiratory infection and response to intranasal vaccination. FRANCIS and others[2] have lately found that the neutralising activity of nasal secretions rises after subcutaneous injection of inactivated influenza vaccines, and suggest that on this, rather than on a rise in circulating antibodies as such, depends any value possessed by such vaccination. BURNET now reports the surprising discovery that freshly isolated human influenza strains differ from laboratory-adapted ones in not being neutralised by human tears; he does not say whether nasal secretions also show up this difference. Other sharp differences between fresh and laboratory-trained strains were observed; we must therefore be more cautious than ever in applying conclusions from the laboratory to the field.

The Australian work is likely to be applied to the control of a pandemic rather than to the prevention of minor outbreaks such as we have had in recent years.

Annotations

TROPICS NOT SO UNHEALTHY IF—

A REPORT[3] from the medical department of a commercial airline operating a service from Bathurst, West Africa, down the Coast to Lagos, thence inland through the Sudan to Egypt (a distance of almost 5000 miles) and finally to India, shows how knowledge can be used to prevent disease. The first 2000 miles took in the semi-jungle country of the West Coast of Africa where although the temperature rarely exceeded 90° F. the humidity was always high, the rainfall reaching in some parts 200 in. a year and the humidity in others not falling below 90% for several months on end. Crossing the African continent the temperature increased but humidity fell, until in the Sudan and Egypt real desert conditions were encountered with average maximum temperatures of 110–115° F. and wide diurnal variations of 60–80° F., while in the Persian Gulf temperatures reached as much as 127° F.

Candidates for service with the airline were carefully selected and the age-limits were set at 18–45 years. A full clinical examination was supplemented by blood-counts, serological tests and X-ray examination of the lungs. Some 16% of applicants were rejected, the chief causes being cardiovascular diseases (20%), visual defects (12%), genito-urinary diseases (11%), and respiratory conditions (10%); those having a history of repeated attacks of venereal disease, chronic alcoholism or peptic ulcer were also regarded as unsuitable types. Accepted applicants were inoculated against smallpox, the enteric fevers, tetanus, yellow fever and cholera, and were provided with mosquito nets, anti-mosquito clothing, a sun helmet, and a supply of quinine and mosquito-repellant before sailing. Of the men sent to Africa less than 3% returned for medical reasons and none of these was seriously incapacitated. In Africa, hospital-bed accommodation was provided for 10% of the personnel, but in fact 1% sufficed. In large stations a medical and surgical officer was provided for each 600 men, but a doctor was posted to each station even when the numbers there were small. Well-trained laboratory staffs and adequately equipped hospitals with properly planned departments, including laundry services, played their part.

1. Burnet, F. M. *Med. J. Aust.* 1943, 1, 385. Bull, D. R. and Burnet, F. M. *Ibid*, p. 389. Mawson, J. and Swan, C. *Ibid*, p. 394.

2. Francis, T. jun., Pearson, H. E., Sullivan, E. R. and Brown, P. M. *Amer. J. Hyg.* 1943, 37, 294.

3. *War Medicine*, 1943, 3, 484 and 619.

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In West Africa, where malaria is rife, military statistics suggested that an attack-rate of 100% per annum, and in some parts even 200%, might be anticipated. However, apart from an outbreak in the first few weeks of hurried assembly—when 46 of 284 men were attacked, and almost 2000 days of work were lost by 300 men in 11 weeks—the malaria-rate proved extremely low. In September, 1942, there was only one case among 1400 employees and in October only 3 among 1800. This was attributed to the aggressive antimalarial measures applied at all the stations of the line. Besides the personal protective measures taken by the staff, all quarters and accommodation were screened and maintenance men were employed whose sole duties were to keep the screening in order. Antimosquito locks of adequate proportions were provided for all entrances, which were kept to the minimum, and all doors were fitted with automatic spring-closing devices. Quarters were sprayed daily and the adjacent native quarters were similarly treated. Oiling, dusting and drainage of potential breeding areas were also carried out and continuous maintenance gangs looked after these works; some 45 miles of ditches were dug in one station alone. Flying personnel had blood-examinations before every flight and the value of this was proven by the fact that in nearly every instance where positive smears were obtained the subject developed a clinical attack within 24 to 48 hours. In the treatment of the acute attacks various combinations of drugs were tried without any striking differences in the therapeutic results, and finally a routine course of quinine, gr. 30 daily for 2 days, followed by mepacrine hydrochloride, 0·3 g. daily for 5 days, was adopted. Almost all the infections were malignant tertian and it was not considered that anything was lost by the omission of pamaquin from the treatment. Quinine and mepacrine were used in suppressive treatment and no evidence was forthcoming that mepacrine diminished tolerance to altitude.

Gastro-intestinal diseases were next in frequency to malaria, and were well controlled by the screening of messes, kitchens and latrines against flies. Before this was done some 20% of the personnel at one station contracted diarrhœa once or twice a month; and in another station the rate fell from 30% to 0 on the installation of flush toilets and the screening of quarters and kitchens. The importance of periodic examinations of all native food handlers was shown by the fact that 28% of the natives were found to be carriers of *E. histolytica*.

Psychiatric problems, often stressed as a cause of trouble in the tropics, were found to be relatively unimportant; but all the personnel were volunteers and their living conditions and food were unusually good. Surgery presented no special difficulties and sepsis was not more common than in temperate regions. The medical staff was convinced that the climate as such had no deleterious effect on health and it was the unanimous opinion that good health can be maintained in the tropics provided preventive measures against disease are aggressively applied.

SENSITIVITY TO PAIN

PAIN is difficult to assess, and the word "sensitivity" is itself ambiguous, for both the man who feels little pain and the one who feels the pain but bears it stoically may be called insensitive. Sherman[1] refrains from a definition, and waits for his patient to "wince, change expression, or cry out," in response to a gradually increasing painful stimulus. His instrument of torture (Hollander's method) is a metal grater, with the business surface in contact with the subject's arm, on which it is pressed by an inflated sphygmomanometer cuff. The pressure at which the victim reacts spontaneously is taken as a measure of his threshold to pain, and he is accordingly classed as hypersensitive, hyposensitive or normal. In spite of the errors likely to be involved in both the stimulus and the reading of the response, any well-marked difference between large groups of patients examined by the same investigator is probably significant. In two series, each of 130 patients, one group with organic and one with functional disease, Sherman finds practically the same proportion of hyposensitive persons (16–17%), while only 6% of patients with organic disease, as against 30% with functional, are hypersensitive. The results are confused by a sex difference, 75% of all the hypersensitive cases being women and 90% of the hyposensitive men, a finding possibly indicating only that women are more thin-skinned than men. The fact that 34% of the hypersensitive cases are under 20 years of age may be open to a similar interpretation. Corroboration by Libman's test of pressure on the styloid process can scarcely be accepted, since there is no way of measuring the intensity of the stimulus. The difference between patients with functional and organic disease seems the most reliable finding, and is rounded off by the study of a group of 150 exceptionally hardy men (coal-miners) who treated even organic disease with contempt. None of them was hypersensitive, and 75% were hyposensitive. A similar distribution of sensitivity in a group of Indians suggests that indifference to pain may be inherited. An investigation of this kind is worth repeating with more precise methods. Routine clinical testing is one thing, but research to establish a principle is another. These results merely extend those of Wilder,[2] who used the same method. An electrical stimulator described by Knowlton and Gross[3] for studying analgesics in dogs would be little more troublesome to apply, but is quantitative, avoids the mixture of sensations which must accompany the gradually increasing pressure of the grater in the sphygmomanometer cuff, and allows of a rest between the increasing stimuli, thus eliminating the adaptation of the pain endings which must occur with a continuous stimulus. Repeated testing of the same individual on different days should also be done, because Knowlton and Gross found a certain variation of threshold in their dogs. They used a slight widening of the eyelids as indicative of the first response to pain, and it is possible that in man some such consistent index could be found. From the clinical standpoint, Sherman's findings are useful confirmation of a general impression, but if they were further substantiated they might lead to a reliable test for helping to distinguish between functional and organic disorder.

TREATMENT OF METHÆMOGLOBINÆMIA

METHÆMOGLOBIN in the blood has been classically associated with hæmolytic diseases, certain poisons, and enterogenous cyanosis. We now know that in hæmolytic diseases the pigment is methæmalbumin, but the other two are definitely methæmoglobinæmias, and the distinction is easily made if one remembers that in hæmolytic diseases the pigment is in the blood plasma whereas in the others it is confined to the red blood-cell. There is one other very rare form of true methæmoglobinæmia; this is one of the "inborn errors of metabolism" and the victims have a varying proportion of their blood hæmoglobin in that form. They suffer no disability, since the total blood-pigment is usually increased so that the normal amount of oxyhæmoglobin is available, but the presence of the methæmoglobin gives them a slaty-blue colour that is ugly, often exposes them to unnecessary investigation, and causes alarm. This disease is so unusual that it might well remain buried in the literature, but it now appears that it can be treated. At a meeting of the Royal Academy of Medicine in Ireland on May 7, J. Deeny, H. Barcroft and D. C. Harrison described two brothers with this condition;

1. Sherman, E. D. *Canad. med. Ass. J.* 1943, **48**, 437.
2. Wilder, R. M., jun. *Proc. Mayo Clin.* 1940, **15**, 551.
3. Knowlton, G. C. and Gross, E. G. *J. Pharmacol.* 1943, **78**, 93.

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both had slate-coloured faces and hands, but, like other cases, their general health was good, although both had about half of their total blood-pigments in the form of methæmoglobin. In 1939 French workers showed that ascorbic acid has a favourable effect on this disease; Deeny and his colleagues confirmed this—in one case a daily intravenous dose of 100 mg. of ascorbic acid reduced the methæmoglobin from 43% to 6% of the total blood-pigments in a month; there was a simultaneous reduction in the total blood-pigment and in the red-cell count. The ascorbic acid appears to act by converting the methæmoglobin to ordinary hæmoglobin. It will be interesting to see if the same treatment can be applied successfully to other forms of methæmoglobinæmia, especially that due to drugs.

CORNEAL GRAFTING

IF an eye is to see, the central three millimetres of cornea must remain transparent; a dense scar in this area will blind an otherwise normal eye. Opacities from corneal ulcers, interstitial keratitis, ophthalmia neonatorum, and wounds or burns of all kinds have condemned many patients to permament blindness, so it is not surprising that surgeons have tried to graft clear cornea on scarred eyes for over 100 years. Even before that, the problem of the leucomatous eye was stirring the mind of Robert Mead,[1] who in 1775 suggested putting equal parts of powdered glass and sugar, "levigated into an impalpable powder," into the eye every day; this, he wrote, "gradually absterges and wears off the spot by its inciting quality." Reisinger[2] was the first to attempt corneal transplantation, for in 1818 he replaced the cornea of one animal with that of another, and at the end of twenty days half of it remained transparent. In 1838 Kissam transplanted the cornea of a six-months old pig to a human eye, but though vision improved immediately after the operation the graft later became opaque. Similar operations were tried by other surgeons but the graft never remained transparent for long, and it is now established that all grafts of animal cornea to man are doomed to failure.

The possibilities of the operation were revived in the '70s by A. von Hippel,[3] who invented a trephine which simplified the procedure and was the first surgeon to transplant from one human being to another a portion of cornea which remained permanently transparent. Using von Hippel's trephine, Zirm[4] reported an exceptionally successful case in 1906, the donor being a boy of 11 whose eye had been lost by injury. From perception of hand movement only, his patient's vision improved to 6/36 more than a year after operation, proving that under certain conditions the operation could be a sight-saving one. Isolated reports continued to appear, but no series from which the success of the operation could be judged was published until K.W Ascher (1919–22) from Elschnig's clinic, and later A. Elschnig[5] himself (1930), published the results of all grafting operations performed in the clinic up to date. The grafts used were whole thickness of cornea, circular and 4–5 mm. in diameter. They were taken from an eye which had had to be removed from another patient, or from an eye enucleated shortly after death. Elschnig found that the graft will be successful in 22% of patients who give no evidence of increase of ocular tension, but that if only the patients suffering from interstitial keratitis are considered the results will be much better than this. W. P. Filatov[6] in Odessa has performed more of these operations than any other surgeon. Up to the end of 1938 he and his school had done 537 transplants. He made several modifications in the operation, but more important than these was his discovery that for transplantation the cornea from a cadaver is at least as good as, if not better than, that removed from a live eye. The eye from which the graft was to be taken was removed up to 24 hours after death and kept at 2–4° C. for from one to eight days. In his series, using cadaveric material, 146 transparent grafts were obtained in 366 cases—40%. The donor's blood was always tested for syphilis, but the blood-group of the donor has no bearing on the chance of a successful operation. Von Hippel noticed that in a successful case the recipient's cornea immediately adjacent to the graft increases in transparency, perhaps because of the increased blood-supply to the cornea necessary to keep the new graft alive, so Filatov has tried grafting the peripheral part of a leucomatous cornea and the centre of the cornea has tended to clear; no precise records of these cases are available yet. In America Castroviejo[7] and his associates at the Columbia Presbyterian medical centre have performed more than 100 corneal grafts. In favourable eyes he says that 85% success may be expected and in 2 cases vision improved from hand movements at one foot to 6/6. In this country Tudor Thomas[8] has done the pioneer work and reported 36 operations by 1937; he says that the graft remains transparent in 86% of favourable cases. Now Leahey[9] who used Castroviejo's twin knives, has published his results in 10 patients. All were improved and several could read book print, the best distant vision being 6/24.

Corneal transplantation, then, has established itself as a practical proposition, and under certain circumstances a high percentage of success can be expected. For good results the ocular tension should be normal and the graft should have areas of semitransparent cornea adjacent to it; because of this and of the ghost vessels already present in the cornea the best results are achieved in interstitial keratitis. There is no doubt that grafting will rescue some of the many eyes blinded in this war by burns and scars of the cornea.

PHENOTHIAZINE UNSUITABLE FOR TREATING THREADWORMS

PHENOTHIAZINE was first tried in the treatment of threadworms by Manson-Bahr.[10] In an investigation of its pharmacology de Eds, Stockton and Thomas[11] had previously recorded an anæmia in 3 patients out of 19 who were being given the drug as a urinary antiseptic, and a similar report came from Hubble,[12] who saw 3 cases of anæmia among 30 children treated. Doubts about the employment of phenothiazine were justified by the death from acute hæmolytic anæmia of a child aged 6 who had been given 8·5 grammes,[13] and two further instances of severe hæmolytic anæmia following its use have been reported by Johnstone[14] in this country and by Grant[15] in Australia. The opinion that it is valuable against threadworms has been qualified by this evidence into a general distrust of its toxicity in children. Veterinary experience has also been that, while it is a reasonably safe anthelmintic for adult animals, it is dangerous to young ones, especially pigs.[16] If any therapist needs further dissuasion from its use, this is provided in a report by Bercovitz, Page and de Beer,[17] who not only confirm the accounts of its toxicity published in this

1. Medical Works of Robert Mead, Edinburgh, 1775, p. 410.
2. Die Keratoplastic, Sulzbach, 1824, vol. I, part 1, p. 207.
3. *V. Graefes Arch. Ophthal.* 1878, **24**, 235.
4. *Ibid*, 1906, **64**, 580.
5. *Arch. Ophthal. N.Y.* 1930, 4, 165.
6. *Lancet*, 1937, i, 1395. Modern Trends in Ophthalmology, Ridley and Sorsby, London, 1940, p. 582.
7. Spaeth's Principles and Practice of Ophthalmic Surgery, Philadelphia, 1939.
8. Thomas, J. W. T. *Brit. med. J.* 1937, i, 114.
9. Leahey, B. D. *New Engl. J. Med.* 1943, **228**, 387.
10. Manson-Bahr, P. *Lancet*, 1940, ii, 808.
11. de Eds, F., Stockton, A. B. and Thomas, J. O. *J. Pharmacol* 1939, **65**, 353.
12. Hubble, D. *Lancet*, 1941, ii, 600.
13. Humphreys, D. R. *Ibid*, 1942, ii, 39.
14. Johnstone, R. D. C. *Brit. med. J.* 1942, i, 259.
15. Grant, L. I. H. *Med. J. Austr.* 1943, ii, 27.
16. Davey, D. G. and Innes, J. R. M. *Vet. Bulletin*, 1942, **12**, 8.
17. Bercovitz, Z., Page, R. C. and de Beer, E. J. *J. Amer. med. Ass.* 1943, **122**, 1006.

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country but also show that, in doses well above the danger level for children, it is not effective against the threadworm (*Oxyuris vermicularis*). Of 10 patients they treated 8 failed to give the three negative swabs regarded as necessary to establish a cure.

Fortunately there is no need to lament the departure of phenothiazine, for its place in the treatment of threadworms has been taken by gentian-violet which is given in coated capsules of grain ⅛. The dose is one capsule a day for each year of age up to six years, and this dose is continued for a week. A second course may be given after an interval if worms are seen in the fæces or ova are still discovered on the swabs. With these doses no toxic effects have been recorded. Wright and Brady[18] obtained 60–90% cures by its use in adults and children, and subsequent clinical experience rates its efficiency more highly still.

FERTILITY AS A CONTROLLABLE FACTOR

JUST now population trends are exciting the opposite-minded to argument—some saying let us have more of one kind of men and others saying let us have less of every kind. Across the controversy the statement of experts convened by the British Social Hygiene Council breathes like a voice from the laboratory. Whatever we think about man, few of us want to picture him as a dying race; and whether we want to extend fertility or reduce it we should prefer not to have the issue taken out of our hands by biological failure. The experts produce evidence (see p. 457) of involuntary impaired fertility in the population which is striking. Experience has shown that in many cases the reproductive function can be restored or improved. Since devices for reducing fertility have stimulated investigators, and are now becoming reliable, treatment for improving it should excite at least equal interest. The plea for better facilities for skilled diagnosis and treatment of all grades of infecundity is sensible and timely.

SERUM REPLACEMENT IN BURNS

THE most profound change that can be demonstrated in the blood of a burnt patient is loss of protein and water. When serum and plasma transfusion was made available some years ago there seemed to be a good chance of saving the lives of those whose burns extended beyond the critical one-third of the total body surface. Unfortunately these hopes were not always realised and it seemed possible that other factors were of greater importance than simple plasma loss. Presman and his associates[19] however believe that the failure of intravenous serum therapy has been due to the use of insufficient quantities. They refer to the work of Elkinton, Wolff and Lee,[20] who maintain that damaged capillaries do not regain their normal permeability (and will therefore go on leaking plasma) for up to 40 hours after a burn. During this time not only must the normal bodily requirements be met, but any loss must be continually made good if a fatal reduction of blood-volume is to be avoided. They cite two cases in which 45% and 50% of the body surface had been burnt and whose hæmoglobin, protein, non-protein nitrogen and hæmatocrit values were recorded during treatment. An estimation of the blood and plasma volume was made from the body weight. Each patient received 4250 c.cm. of serum during the 68 hours following the burn, 1750 c.cm. being given during the first four hours. In addition other fluids were given by mouth and vein, so that one patient took no less than 19,970 c.cm. of fluid during the 68 hours after the burn—that is, 7000 c.cm. in excess of normal requirement in 24 hours. As a result, it is said, of these heroic measures, both patients made uninterrupted recoveries. Unfortunately the parsimonious equipment of many hospitals precludes any attempt at accurately controlled treatment on these lines; and indeed where the patient may have been anæmic before sustaining the burn any attempt to maintain a *normal* hæmatocrit value might meet with disaster. Presman and his colleagues therefore conclude with a simple rule to follow in the treatment of severe burns. They recommend that 50 c.cm. of serum should be given into a vein immediately for every 1% of body surface which has been burned, with an additional 20–30 c.cm. for every 1% during the first 24 hours and another 20–30 c.cm. in the first 72 hours following the burn, thus totalling 100–110 c.cm. for each 1% of body surface burnt. These recommendations may be summarised as follows:—

	Volume of serum to be given for each 1% of burnt surface.
Immediately	50 c.cm.
During first 24 hours ..	20–30 c.cm. } in addition.
During first 72 hours ..	20–30 c.cm. }

They state further that no crystalloid fluid should be given during the first 24 hours, but that fluids and a high-protein diet by mouth should begin as soon as possible. It is to be hoped that others will have the same measure of success with their method.

THE LAST OF DR. THORNDYKE

Dr. Austin Freeman, whose death is announced on another page, gave more pleasure to his colleagues, in his time, than perhaps is usual in our profession. If Conan Doyle set the standard for scientific crime investigators, Austin Freeman, in his stories of Dr. John Thorndyke, has carried on the Holmes tradition scrupulously. Like Holmes, Thorndyke is credibly—but only just credibly—well informed; he has the same passion for accuracy, the same meticulous attention to detail coupled with a considerably greater knowledge of laboratory technique, and an equal disregard for the lure of matrimony. He lacks Holmes's more spectacular and endearing side, perhaps: no opium, no violin and no situations contrived for theatrical effect find their way into Thorndyke's well-regulated life. Here is a serious-minded scientist, and the reader is expected to get his fun out of the hard labour of detecting, not out of the foibles of the detective. He does, too. Whether helping Dr. Thorndyke to look into the manners and customs of marine worms, or breathing down his neck while he examines (for arsenic) a lock of hair from a long-dead girl, the reader gets his ration of interest and excitement; and he is blessed with an encyclopædic mind who puts down an Austin Freeman without having learned some odd new fact or other. Doctors, many of whom are martyrs to detective literature, nearly always enjoy the details of medical jurisprudence which Thorndyke had at his finger tips. It is perhaps a measure of Freeman's skill that he often dispensed with surprise in his puzzles; he could tell his story backwards—beginning with the culprit and working through the steps by which he was undone—without losing his reader's attention.

18. Wright, W. H. and Brady, F. J. *Ibid.* 1940. 114, 861.
19. Presman, D. L., Janota, M., Weston, R. E., Levinson, S. O. and Necheles, H. *J. Amer. med. Ass.* 1943, 122, 924.
20. Elkinton, J. R., Wolff, W. A., and Lee, W. E. *Ann. Surg.* 1940, 112, 150.

ROYAL COLLEGE OF PHYSICIANS OF LONDON.—On Monday, Oct. 18, at 2.30 PM, Dr. W. E. Hume will deliver the Harveian oration.

ROYAL SOCIETY OF MEDICINE.—On Tuesday, Oct. 12, at 5 PM, Dr. W. Norwood East will deliver his presidential address to the section of psychiatry on the state, the criminal and the psychiatrist. Mr. Malcolm Donaldson will give his presidential address to the section of obstetrics and gynæcology on Oct. 15, at 3.30 PM. He will speak on the cancer problem from the point of view of the young gynæcologist and a discussion will follow. There will also be a discussion after Dr. N. S. Finzi's presidential address to the section of radiology at 4.45 PM on the same day. The subject is to be impending new developments in radiotherapy.

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Special Articles

CARE OF THE CHRONIC SICK

LETITIA FAIRFIELD, CBE, MD, DPH

PROBLEMS raised by chronic sickness are important but have been neglected in most schemes for medical reorganisation. Chronic sick patients are numerous, especially in the higher age-groups, and their long occupancy of beds holds up a high percentage of the total accommodation. From the administrative point of view they overlap with the crippled or "physically handicapped" and in the upper ages with the "aged and infirm." Hence the total numbers cannot be exactly estimated, but the extent of the problem may be partly gauged by the London figures.

Chronic sick in London	*August 1939*	*March 1943*
(*a*) In public health chronic sick establishments	3818	2314
(*b*) In acute general LCC hospitals	1400	1600
(*c*) In social welfare institutions	416	35
Total	5634	3949

(The numbers in March, 1943, were reduced by evacuation)

In addition about 35 chronic sick are maintained in voluntary institutions by the London County Council and a considerable number (who cannot, however, be separated statistically from the aged and infirm), are living at home on out-relief. The number of chronic sick not maintained or assisted out of public funds is even more difficult to ascertain but must be considerable. For every category there is a serious need for paying accommodation to meet different grades of income.

(A) PREVENTION

Every advance in medicine and surgery brings some reduction in the number of permanent invalids, and good national planning bringing the best medical skill within the reach of all, will presumably also reduce the numbers of chronic sick; the impending increase in the average age of the population, however, will keep up the *relative* proportion of chronic invalids. Of recent years, the improved care of surgical tuberculosis, of anterior poliomyelitis, and rheumatic heart disease has enormously reduced the number of the permanently disabled among the young. A fortunate flash of inspiration on the treatment of arthritis, or of chronic lung disease would have a similar effect in clearing the adult wards. Schemes now afoot for rehabilitation after illness and accident should also have a slow but steady effect in reducing the numbers to be provided for. It will be assumed therefore that the chronic sick whose care we are considering are the irreducible minimum of permanently disabled persons incapable of self-maintenance and requiring permanent medical supervision and usually some degree of nursing care.

(B) CLASSIFICATION

Classification is not easy because the patients cover all ages, an immense range of diseases and wide differences of mental capacity. Their needs, whether physical or mental, are not all the same. Any system of grouping should therefore take into account: (1) age; (2) degree and nature of disability (e.g., bedridden or ambulant); and (3) mental capacity and temperament.

(1) *Age.*—Experience has shown that the chronic sick may conveniently be divided into four age periods:

(*a*) Children under 16. Most children who require long hospital care may now be considered as long-term treatment cases rather than chronic sick, but a few unimprovable or deteriorating cases remain. They include disabling congenital deformities such as spina bifida with incontinence, progressive paralyses, advanced cardiac disease and other rarer conditions.

When the LCC took over the guardians' responsibilities in 1930 some of these children were found lying in great unhappiness among senile cases in the wards of municipal hospitals and institutions. A separate unit was formed for them in a small LCC children's hospital in 1933. It never contained more than 25 children, though cases were received from outside London in addition. A teacher was provided by the education officer and the children had access to a garden. The unit though an improvement on their previous surroundings was never a complete success. The children's diverse ages and intelligence levels made the task of teaching and amusing them almost impossible, while the staff found their duties exacting and unproductive of results. At the outbreak of war this unit had to be broken up and the children were distributed among the long-term orthopædic and rheumatic cases at Queen Mary's Hospital, Carshalton, according to their age and disability. Here they are far happier and better placed. No staff has to be specially allocated to them and they enjoy contacts with more normal children and the wider range of interests found at Carshalton. Probably the cost per head is no greater than when they were segregated in a special unit.

(*b*) Adolescents and young adults. These patients resemble the group under 16 from the medical point of view, and many of them have in fact spent many years under treatment in children's hospitals. Some are in the terminal phases of fatal disease, others have years of life ahead. In some ways they are more difficult to provide for than the children as they have more insight into their fate. They must be as fully occupied, body and mind, as their condition allows, and they need whatever medical and nursing care can mitigate their disease. Handicraft instruction, books and discussions on current affairs, and the teaching of simple occupations such as flower-making or toy-making or embroidery should all be included in the schemes for their care. Even the bedridden can often earn a few shillings a week with some benefit to their pockets and immense benefit to their self-respect. They feel they can do something for somebody, which is almost a definition of life as opposed to stagnation. The upper limit of this young adult group need not be too strictly drawn but it has been found from experience that the young incurables do greatly enjoy each other's company and separation from the more depressing older invalids.

(*c*) Older but mentally alert adults. These are mostly the victims of arthritis or disseminated sclerosis or chronic heart or lung disease. They are usually past the training stage but are capable of carrying out simple needlework or handicrafts, and they enjoy wireless, visiting and books, and the amenities of life they have been accustomed to. It is important to keep them apart from the senile group and from constant association with the dying.

(*d*) The mentally deteriorated and senile. A large proportion of the chronic sick are of advanced age and others are suffering from some disease such as cerebral thrombosis which has impaired their mental faculties. These old people's requirements naturally vary with their physical condition and social background, but a great number seem well satisfied with a little knitting, some wireless, sufficient food and warmth. They greatly value visits from relatives or old friends, but the advances of strangers, however well-meaning, are apt to meet with a poor response. As a ward-sister recently remarked to me, "They live in the past and take less interest in present contacts than one would think."

2. *Degree and nature of disability.*—The diagnosis of "chronic sick" is a serious one for the patient and should only be made with a full sense of responsibility and after careful examination. If the case has not been fully explored already, it is advisable to arrange for complete overhaul in a fully equipped acute hospital. An estimate can then be made of the amount of incapacity, the probable expectation of life, and the need for palliative treatment such as massage. If the question of training for a trade or admission to a sheltered workshop arises, the doctor consulted should have some knowledge of the problems involved in the training of the handicapped. Lack of these obvious precautions has led to deplorable errors in disposal, as for example, patients with minor or improvable defects being cast unnecessarily into the stagnant pool of a workhouse ward, while others with progressive paralysis or advanced heart-disease may be sent for expensive trade training.

Medical supervision of all chronic sick though not necessarily continuous should be careful and efficient, the patient being kept at his maximum of physical efficiency and comfort. At the same time wasteful procedures such as long-continued massage or hydrotherapy, producing no real benefit, should be avoided. Periodic overhauls will ensure that no unexpected improvement has taken place or no intercurrent disease has developed.

For the bedridden good nursing is essential, and these patients afford excellent nursing training. The question of nursing the chronic sick remains the subject of controversy. It is becoming generally recognised now that the ordinary

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nurse in her training should learn something of their care, but it does not follow that the highly qualified "trained nurse" is the best person to staff chronic sick wards. In the opinion of many superintendents, the assistant nurse comes much nearer the ideal for this purpose. Some women (not always the best examinees) have a special vocation for chronics and the aged, as others have for children, and well-organised schemes will endeavour to make full use of this fact and to give these nurses an honourable place in the profession.

3. *Mental capacity and temperament.*—Wise planning for the chronic sick entails the estimation of their mental condition and temperament. The psychotic and the mentally defective should be dealt with as such, under the ample legal provision made for them, and should on no account be mixed with chronic sick patients of normal mentality. This is a matter of much greater importance to the patients, who have to live at close quarters with each other, than to the staff. Any scheme should also include some machinery for classifying and segregating senile dements, who are apt to be intolerably noisy and offensive neighbours. In London it has been customary for many years to transfer such senile patients without certification to a separate institution.

Where training schemes are contemplated, an exact estimate of the patient's intelligence becomes important and an intelligence test should be applied by an expert. The casual observer is most likely to go wrong in dealing with spastic, athetotic or hydrocephalic cases. The common tendency is to *under*estimate the mentality at first sight, then to *over*estimate it and to form much too hopeful a view of trainability, with inevitable disappointment.

(C) DISPOSAL

The alternatives before those who have to provide for the chronic sick are:—

(*a*) Home care by relatives or guardians.
(*b*) Voluntary homes.
(*c*) Special wards or departments in acute general hospitals, voluntary or municipal.
(*d*) Special municipal hospitals.

(*a*) *Home care* is, in the opinion of many experienced doctors, nurses and social workers, the method of choice.

That this feeling still prevails among the public was shown by the fact that on the morning after air-raids began again in the spring of 1943, 68 chronic sick persons were sent in to one LCC hospital in South London. The relatives were willing and anxious to look after them under normal conditions but could not get them into air-raid shelters. It is an indication of decent feeling in a community that people should want to look after their helpless relatives and chronic invalids, who on their part are usually happiest at home. There they can obtain emotional satisfactions which few institutions can give and they can find useful natural outlets for their energies in place of work expensively devised for them. Friendly visiting by philanthropic organisations can often be arranged, and the Boy Scouts and Girl Guides have excellent schemes for keeping in touch with bedridden young people. The chief obstacles in the way of family care for chronic invalids are: (1) inability to undertake the nursing (here good district nursing associations can help, and should always be in the forefront in the care for the chronic sick); (2) inability to maintain a "bouche inutile." Here a sympathetic and constructive attitude on the part of the public assistance authorities is all important. The Poor Law Act, section 14, is almost the only statutory expression of family responsibility now remaining. Outdoor relief is a real economy if it prevents unnecessary institution or hospital admissions. It should recognise generously the invalid's special needs—for example, extra nourishment and surgical appliances. The new Act of 1943 enables larger money allowances to be given and if the Beveridge report materialises, these benefits will all come under the heading of security assistance and not of public assistance.

In many cases even if nursing and financial help are available the invalid puts an excessive strain on family resources—or there may be no relatives. The alternative of boarding-out with strangers is theoretically possible but in practice it rarely works well with the chronic sick. Few conscientious people are willing to undertake the responsibility of invalids not related by blood, and the authorities naturally have to guard against the unscrupulous who would only too willingly exploit the helpless for gain. In a large number of cases, therefore, institutional care of some kind is inevitable.

(*b*) *Voluntary homes.*—In making the voluntary home the second method of choice, I am using the accumulated experience of officers in the Public Health and Social Welfare Departments over 13 years. These homes are preferred by most of the younger patients. They offer a freedom from restrictions, a sense of independence and homeliness, which the larger institution cannot reproduce. Often, too, the staff have a special sense of vocation and the atmosphere is coloured by their religious beliefs in a way helpful to patients. Voluntary homes now available vary from small and shabby establishments with a dozen beds, run by a pious old nurse, to large specially built hospitals such as the Anglican homes at Woking and St. Peter's, Kilburn, and the Catholic home at St. Joseph's, Edmonton. Most of these homes provide handicraft instruction; they give the women and men opportunities for shopping and visiting neighbouring places of entertainment, and some have facilities for massage and light therapy. The most valued feature of the voluntary home is the freedom with outside contacts it allows and the liberty given to the patients to keep their own small possessions round them and to wear their own clothes.

Voluntary homes for chronic sick are usually—but not always—registered as nursing-homes and should be carefully and strictly inspected. Not only the small ones run for profit but the large establishments of famous religious orders have dangerous potentialities. Their cardinal faults are overcrowding, understaffing, and the admission of mental and senile patients who annoy others.

I have known a paralysed man not washed all over for three months, a paralysed woman left to starve on a few sips of milk a day because no food chart was kept, an advanced cardiac case terrified by a senile dement who was allowed to wander into her room with a knife. All these incidents took place in well-known institutions, but they all should have been prevented by adequate inspection and strict insistence on rules. An important point is that patients should not be sent beyond reasonable distance from the area of the local authority maintaining them (about 50 miles is roughly our limit in London). They can be visited and inspected from time to time and recalled to hospitals of the responsible authority for overhaul and treatment if necessary. Town planning schemes should take into account the need for these small homes and hostels when framing regulations for zoning.

Chronic sick patients maintained in voluntary homes should be carefully selected and some trouble taken to allocate them to the right type of home. The following classes of patients will be found unsuitable and should be otherwise accommodated:—

1. Those requiring heavy nursing—unless the responsible authority is convinced that an adequate supply of skilled nurses is *continuously* available in the voluntary home.

2. Those with disabilities offensive to other patients at close quarters (incontinence, unsightly skin diseases, persistent sinuses).

3. Patients of quarrelsome or neurotic temperaments. If efforts to adjust these patients to their surroundings fail and they persist in creating an atmosphere of misery around them, they should be brought into a large institution where they can do less harm. Repeated attempts at placement mean mistaken philanthropy.

4. Mentally deteriorated patients.

Even before the war there were far too few voluntary homes for women and hardly any for men. The practical difficulty confronting these voluntary homes is that the turnover is so slow that subscribers lose interest, and they are hard to maintain. The few large well-endowed chronic hospitals are difficult of access and rarely have vacancies. A few "homes for the dying" exist, which perform a most valuable function in the last phases of disease. Their number could probably be greatly extended if an appeal was made to religious bodies for this kind of service. The present cost of these homes is up to £2 5*s.* per bed per week. The maintenance is much cheaper than in public institutions, and gives happier results.

(*c*) *Special wards in acute general hospitals.*—The treatment of the chronic sick has been consistently unpopular with both the medical and nursing professions. The voluntary hospitals, great and small, would have little to do with them and the honour of making the

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necessary and humane provision has therefore been almost exclusively that of the municipal hospital.

The teaching hospitals have suffered from this attitude, for both the budding doctor and the nurse have much to learn about the treatment of the bedridden and of the mitigation of advanced stages of disease. It is this kind of case which they very commonly meet in general practice. The chronic sick have suffered from this ostracism too, for a tradition of hopelessness and inertia has grown up around their problems, and undoubtedly much that could make their lives brighter and reduce their numbers has been omitted.

For the future it has been suggested that all general hospitals, including the great teaching hospitals, should be compelled to reserve at least 10% of their accommodation for chronic sick.

As the turnover would be slow, it might be advisable to reserve these wards for specially selected types of chronic sick —for instance, terminal phases of fatal disease, patients with chronic conditions requiring treatment or on whom new methods of treatment could be tried, patients needing an overhaul or full examination before transfer to another institution. It might be thought advisable to limit the stay in these chronic wards to 6 months as a general rule. It should be clear that these wards, to be any use, must be in the main hospital; dumping the patients in a country branch miles from their friends would be no solution.

DISCUSSION

Even after all suitable cases had been placed in voluntary homes and the voluntary hospitals have taken a 10% quota the bulk of the chronic sick will remain for the municipal hospitals to dispose of. The first important change required is improved classification. In this, many hospitals have admittedly failed largely owing to the fact that the accommodation has never kept up with the demand.

A beginning has however been made. We have had 10 years' experience of an adolescent chronic sick male unit for 25 lads and men at Queen Mary's Hospital at Sidcup, which is an outstanding success. A handicraft instructor was secured who created interest and enthusiasm in his workers. Being situated in a convalescent home with plenty of entertainments to which the young men had access, and plenty of contacts with the normal world, the atmosphere is cheerful and stimulating. To put a unit for severely handicaped chronic sick in the middle of a convalescent hospital was a daring experiment, but has proved a success largely owing to the personal enthusiasm of the staff and the fact that the proportion of chronic sick has been kept small. A similar unit for young women is being developed at another LCC hospital.

Of the remaining chronic sick, the younger and more mentally alert should be gathered in the better type of ward at the disposal of local authorities. Sun balconies should be provided where there is no access to gardens. Some of the wards should be divided into bays or cubicles by partitions to give more privacy. The patient's previous social background largely determines whether he prefers privacy or sociability. Many Londoners are wretched in small rooms.

The most desirable move, however, would be to allow the patients to have a small space around them for their family portraits, pictures and a few small possessions. Even a locker-top is better than nothing. "You would make the place look like a home and not a hospital" said an indignant matron when I suggested this. That was in fact the idea. It is the only home these poor creatures will ever know. The possibility of combining such accommodation with a sheltered workshop where a simple trade could be carried on is being explored.

The senile and mentally deteriorated are probably quite as happily placed in their long open wards, with a day-room annexe, as they could be anywhere. For them the most important factor is to be near relatives whom they remember, for contact with strangers is no particular pleasure to them. Small dietary changes and treats, such as cakes and sweets, are almost their only other pleasures.

How far the chronic sick in municipal hospitals should be gathered into separate institutions, or how far accommodated in special blocks or wards in general hospitals, is a difficult question. It will depend largely on the accommodation at the disposal of the authorities. If the classification outlined above is carried out, it should not greatly matter to the patients themselves but it does matter a good deal to the staff. Few nurses and doctors like to work in a big hospital devoted solely to the senile and incurable and the number of such establishments should be reduced to a minimum. Wards or departments for some acute specialty, or research units, say dealing with arthritis or diabetes, might well be combined with chronic sick accommodation.

Whatever method of disposal is adopted, all grades of chronic sick should have ample and varied food, warmth, cleanliness, and devoted and skilled nursing according to their needs. Equally important is full occupation for body and mind up to the limit of their capacity.

STERILITY AND IMPAIRED FERTILITY

CONCLUSIONS AT A CONFERENCE CONVENED BY THE BRITISH SOCIAL HYGIENE COUNCIL *

THE official census data do not yield any direct information concerning the frequency of sterility (childlessness) or impaired fertility (small number of children). Nearly all information in this field springs from the general experience and the specific efforts of individual workers—mostly clinicians interested in the treatment of involuntary sterility. The following summary reflects the views formed by British and American investigators.

About a tenth of all marriages remain childless. It has not been suggested that there are class differences which would reveal themselves without specific statistical investigations. Childless marriages among working-class patients are common.

Permanent childlessness is rarely deliberate. This conclusion is based on the experience of medical practitioners and on specific investigations. Thus inquiries were made among industrial workers in order to ascertain how many of the married but barren women were deliberately childless. This inquiry was conducted by a doctor who interviewed personally every woman; and the inquiry was appropriate since the childless women numbered up to 18% of groups (consisting of about 50 women each) questioned. Similarly another investigator inquired into the history of about 70 childless middle-class families who had not applied for advice. It appears that in about 90% of childless couples who have been married for at least 5 years the absence of children was caused by impaired reproductive power (low fecundity).

Furthermore, such inquiries among patients who did not request advice for sterility show that in at least 60% of one-child couples (numbering more than 100) married for more than 5 years, further conceptions were either desired or not deliberately prevented. Clinical experience extending to many hundreds of cases and investigations among working and middle-class women indicate that the small family (two children) is also often due to low fecundity and that fecundity tends to fall after the first or second confinement.

Data collected by individual clinicians and extending to over 4000 cases and by clinics show that birth control although applied at times by the great majority of the population is rarely (in about 5% of young couples) intended to procure permanent barrenness. Furthermore, effective methods of birth control are usually sought among the working class only by women who have had one or more children. One of the statistical expressions of this fact is that in one group (numbering more than 200 women) of regular users of birth control the average number of children was higher than in a comparable group of women using the same methods intermittently. Further investigations show that the contraceptive methods most commonly used by the industrial population are notoriously unreliable (coitus interruptus or soluble pessaries); their seeming success to which many working-class women attribute the small size of their families (e.g. 3 children in 15 years of marriage) can be shown to reflect lowered fecundity in at least a third of the cases (about 100) investigated.

* Members of the conference who signed the statement were Dr. V. B. Green-Armytage; Dr. Mary Barton; Prof. F. J. Browne, FRCOG; Mr. R. Christie-Brown, FRCOG; Miss Gladys Dodds, FRCOG; Dr. Greta Graff; Dr. A. Green; Mrs. Clare Harvey, ARCS; Dr. Margaret Hadley Jackson; Prof. R. W. Johnstone, FRCOG; Prof. W. C. W. Nixon, FRCS; Mr. C. Lane-Roberts, FRCOG; Dr. A. Sharman; Miss Margaret Moore White, FRCS; Mr. B. P. Wiesner, PH D; Mr. Kenneth Walker, FRCS.

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Considering all available information it seems that in 60–90% of all barren and one-child couples lowered fecundity (depending on involuntary factors) is involved. Lowered fecundity is also often found in couples with 2 or more children. But its practical significance is less than in the one-child families because the use of effective methods of birth control increases with the size of the family. This widespread infecundity of the population is due in part to low female fecundity; particularly to conditions which tend to develop after confinements or miscarriages. But low reproductive power in men is very common; about 60% of husbands of childless women are either incapable of producing offspring or fail to attain a level of fecundity which would make conception easy (data from about 2000 cases, and from American findings). Similarly the husbands in one-child families are often of low fecundity. Examinations of about 100 volunteers (medical university students and professional men) confirms the view that average male fecundity is much lower than is commonly assumed. It appears to be definitely impaired in at least 1 out of 5 men examined. The men examined were mostly in good general health.

Nearly 90% of the middle-aged childless women (i.e. the last generation of married women) of the industrial groups interrogated in inquiries had accepted their fate without seeking specific help from any doctor or clinic. The remaining women sought advice; but in less than 5% was adequate or even relevant advice given. Middle-class women seek adviee much more often. In the great majority of cases examinations and advice still tend to be limited to the wife; recognition of the common male responsibility is relatively rare.

On the other hand the few specialised clinics which at present give advice on sterility are sought out by increasing numbers of women. Of the present generation of potential mothers one Glasgow hospital which maintains a sterility clinic (for women only) admitted 303 cases in 1938; and 505 cases in 1942. A similar increase of attendances has also been seen in others of the few clinics in this country which supply adequate facilities for the diagnosis and treatment of sterility. The interest shown by childless men is of a less active kind, but refusal to undergo examination is rare in childless or child-poor men (under 5% in hospital practice). A consideration of all available data strongly suggests that the barren and the very small family reflect lower fecundity rather than excessive unwillingness to reproduce. This being so, no effort to solve the problem of the decline in the population can be considered satisfactory unless it recognises the necessity for providing facilities for the skilled diagnosis and treatment of all grades of infecundity.

CURRENT EXPERIENCE

Mr. R. CHRISTIE-BROWN said at the conference:

Of 400 patients who have consulted me with reference to some gynæcological or obstetric condition, 100 of these were complaining of sterility. . . . In only 32 of these 100 cases did the husband submit his semen to test, and of these 12 were considered to be sterile.

Dr. MARGARET HADLEY JACKSON had found that the number of patients coming for advice on sterility to the Exeter Family Planning Association Clinic had increased rapidly over the past few years. She gave the following figures of cases treated:

1930	*'31*	*'32*	*'33*	*'34*	*'35*	*'36*	*'37*	*'38*	*'39*	*'40*	*'41*	*'42*	*'43**
0	0	1	0	1	1	6	10	11	12	15	23	30	51

* To July.

In the early years, she said, patients had come on their own account but for the last two or three years most of them had been sent by their own doctors. Of the 51 cases seen so far this year, 20 had used no form of birth control. Before attending the clinic patients had been married for an average of 5 yr. 2 mo. Less than 2% of husbands had refused to supply seminal specimens for examination; and rather more than 50% of these specimens had shown evidence of reduced fertility.

Miss M. MOORE-WHITE, FRCS, had obtained the following figures from a series of 100 consecutive cases where it had been possible to analyse the husband's semen. She noted that out of 162 new attendances in less than a month, 17% were seeking advice for sterility; only 1·8% had been married for less than 2 years.

		%
Nothing abnormal in either couple (no tubal obstruction, serious seminal changes or gross endocrine defects)		20
Women:	Fallopian tubes	
	Blocked	17
	Patent	52
	Rigid (no peristalsis)	24
	Obvious endocrine defects	7
Men:	Normal	43
	Impaired fertility	43
	Azoospermia	14

Dr. ALBERT SHARMAN reported that the total number of new patients complaining of primary sterility at the Royal Samaritan Hospital for Women, Glasgow, had risen from 392 in 1938, and 387 in 1939, to 505 in 1942 and 318 for the first six months of 1943.

In England Now

A Running Commentary by Peripatetic Correspondents

I AM working in a large municipal hospital. After more than thirty years service in a voluntary hospital with a medical school I find constant interest in noticing the differences between the two. They are not always easy to discern or to define, and yet all the time I am conscious of some subtle but definite difference in the atmosphere in which I work from that to which I have been so long accustomed. Some at least of the reasons for this are plain enough. First there is the physical environment. This straggling yellow brick building and its long stone-floored corridors are without charm, as they are without tradition. How much these two qualities affect us in our student days, as we pass through some great London or provincial medical school, it is hard to say. At the time we do not realise much the effect of these influences, but later in life we know that the influence was there and that it is still active. Does the Guy's man ever quite forget that his was the hospital of Astley Cooper and of Gull, or the Bart's man that Abernethy and Paget worked there, or the doctor from St. George's that he shared those precincts with Hunter and Jenner and Brodie? The municipal hospital has no such background. It is not the fault of the system on which it is run: it is merely the defect of youth, and youth is a fault which time cures. Doubtless, too, age will improve even the appearance of these institutions. Years will mellow the yellow brick. Flower beds and flower boxes may appear, grass plots be laid in the grounds. Another potent cause of the different feeling that one gets here from that engendered in the voluntary hospital is the absence of students. There is a lack of cheerfulness, let alone of gaiety—two emotions as precious to doctors as to their patients. There is, too, absence of that healthy rivalry set up by competing companies of dressers and clerks each jealous for the renown and performance of its own chief. This is replaced by an overwhelming obligation to conform to the many rules and regulations of the institution and a haunting fear lest one tread on the toes of a superior officer, or (more dreadful still) fail to comply with some rule, regulation or desire of the lay persons who are lords and masters of the hospital. One feels a lack of freedom. Worse still there is the impression that the primary object of the place is to put forth records that will satisfy the council. Records become more important than recoveries. Treatment may fail: that will not be observed by the ladies and gentlemen of the governing body. But what is written down is open to their inspection and the year's figures must not fall below those of former years.

Some of the sisters here are so hard put writing statements in triplicate that they barely find time to supervise their nurses and wards. At a time of paper shortage this hospital could still rival most government departments in the production of script that will be rarely if ever read. The fanatical inelastic devotion to routine rule and regulation has sometimes an unexpected and curious result. There is said to be a man here who drifted into an observation ward, having somehow avoided the proper mode of entry to the place. He was accredited to no medical officer. He made himself useful in the ward and the Sister liked him. It was nobody's duty to displace him; he had not been offici-

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ally admitted so he could not be officially discharged. So far he has been an inmate for a mere fifteen years.

* * *

Dr. Gray's proposal, which its representatives adopted recently, that the BMA should seek to establish itself as a corporate body, reminds one naturally of the BBC where the parallel of the doctor-patient relationship persists unimpaired. Each licenced listener, paying his less-than-a-shilling-a-month towards the maintenance of the national radio service, still retains unchallenged the ancient Englishman's right to choose his own set—and his own programmes; but at this point in the parallel the doctors will demur. "Choose your own doctor? By gad, Sir, yes! But dammit, Madam, you *cannot* choose your own bottle of medicine, no matter how pretty it looks!" However . . .

* * *

The little lane leading to the great hospital where I go to work has on one side a high old brick wall and on the other a row of six tiny cottages joined together. A slanting tiled roof covers them, and each has white shutters to its little square-paned window, and an architrave of wood over its green door. The door itself is made in two parts, divided horizontally. Thus the little inmate can at will peer out of the upper part without opening the lower to an intruder. These six little houses are three hundred years old. They are a charity and are occupied by six little old women. The occupants must be old, to satisfy the terms of the bequest, and they must be little to meet the restriction of the houses. No large woman could exist happily in one of these dolls-houses. There is a front room which is parlour, dining, and bedroom, and beyond a tiny kitchen leads on to a diminutive garden. Here the little old women grow a few vegetables and a few simple cottage flowers. Beyond the garden flows a small stream. With this behind, and an unfrequented lane in front, the cottages provide as quiet a haven as could be wished. Yet my only conversation with any of the inhabitants was to take part in a quarrel. Human passions defy environment as well as old age. As I passed up the lane number Six was in difficulty with her doorkey. She was locked out of her little house and could not open the door. She appealed to me for help. Three doors down number Three could be seen peering over her half door. "She can do it," cried number Six, "she can let me in, but she is a wicked woman. Oh, she is a wicked woman, and I got her here. She is at that cottage through me and she is such a wicked woman." I walked along to wicked number Three who seemed an amiable old lady; she denied all knowledge of number Six's assertions, and especially that she could be of any help about the door. So I went back to number Six and suggested that she walk with me to whomever there was in charge of the cottages. She fell in with this readily enough and off we started, the old lady freely expostulating on the way on the iniquities of number Three. Poor number Six. A few days later when I passed her door no half pint of milk stood in its usual place outside; shutters were closed and door shut. Number Six now is a newcomer, just as old and small, but without apparent antipathy to number Three. What strange mental disturbance heralded the rapid decline and death of that old woman I am not enough of a neurologist to explain.

* * *

For years I had admired Kingsley Wood's devotion to running a legal aid bureau for poor persons in Shoreditch before I first came into personal contact with him over the National Health Insurance Bill, when he was indefatigable in helping Mr. Lloyd George to bring in the industrial insurance companies, for which Sir William Beveridge now has so little use. As chairman of the London Insurance Committee he was always friendly and always helpful when his interests did not differ from medical interests, and whenever we met he had a cheery word to say about the old fighting days. I never regarded him as a heavy-weight but I am bound to say that his subsequent career modified that opinion. He was of course handicapped by his cherubic appearance and by his voice, but he triumphed over these difficulties. It has been said that he was a friend of the little man and rather inclined to distrust experts, particularly medical experts; that is a pretty sound opinion and I would add for myself that he was actuated not only by ambition but by a genuine desire to do good public work. At one thing he was transcendently good: he introduced orderliness into every department he entered. And that I expect explains why our lift attendant was enthusiastic about the way everyone, including himself, had been fairly taxed.

* * *

For some time past I have been carrying out a miniature Gallup poll on my own by putting to my friends the question, which of the national services apart from the fighting services will have the strongest claim on the Treasury after the war? No-one has yet categorically put the health services first. Some people think housing, but the strongest group seems to be in favour of transport. I cannot help thinking the time has now come when we should get down to practical work. Assuming that the allocation from the Treasury will be strictly limited (not to mention that from local rates), in what order should we start our reforms? It is very important we should have clear ideas about this.

MEDICAL DEFENCE UNION

Dr. JAMES FENTON, addressing the annual meeting on Sept. 21, said that the abbreviated report was not an indication that the work of defence had grown smaller, or that members of the council had given less service. Notwithstanding difficulties of travel and pressure of professional work, the meetings of the council and its committees had never been better attended. Omission from the report of the useful comment on medico-legal problems was simply a measure of the council's desire to assist the Government's war effort in saving paper. The war had not indeed reduced the number of allegations made against members of our profession; litigation continued on an increasing scale, and the public were increasingly insistent on their rights. Hundreds of members had been interviewed during the year, and thousands of letters of advice written. Dr. Fenton referred to "the Spackman case" in which the union had challenged the procedure followed by the General Medical Council, which took the case to the House of Lords where it was settled in favour of Dr. Spackman, who had now been reinstated on the Medical Register. The decision of the House of Lords would, he felt sure, be quoted through the years to come as a benefit not merely to Dr. Spackman, but to the profession as a whole, and he paid tribute to Mr. Hempson (solicitor) and Mr. Dickens (counsel) who remained steadfast in their opinion from beginning to end. "I wish," he went on, "to add the opinion of myself and others of our council that the General Medical Council is anxious to be fair to all who appear before it on any charge whatever. We are closely acquainted with the work of the GMC, and we hold the view that it is well fitted to investigate professional matters. For myself I would prefer to be judged by this distinguished body of medical men, familiar with all the dangers and difficulties peculiar to medical practice, than by a civil court. Let me say that the MDU did not in any way object to the GMC going to the House of Lords. We appreciated entirely their point of view; there was merely a difference of opinion by the legal experts who advised the two bodies, and it was felt on all hands that it should be solved once and for all. We have always been happy to work in close harmony with the GMC, and nothing has arisen between us in this case to interfere with our relationship."

Dr. Fenton concluded with two warnings. The doctors who are coming back to practise, taking the place of colleagues who have been called up, may have terminated their membership of the union on retirement, and may not now be in full benefit. Their first duty to themselves and their families is to satisfy themselves that they are once more registered as members. Better still if doctors hesitated before resigning membership on joining the Army or retiring, for legal questions arise and charges are made months or even years after the alleged negligence occurred. And secondly, doctors must not assume that membership of the union will be unnecessary if the state takes control of the profession. The state will certainly not accept liability for their errors or omissions.

Following the meeting the elected members of council reappointed Dr. Fenton president for the session 1943–44, Mr. E. D. D. Davis treasurer, and Dr. Roche Lynch chairman of committee. Mr. Ivor Back's name was added to the list of vice-presidents.

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Letters to the Editor

SCIENTIFIC FREEDOM IN GOVERNMENT SERVICE

SIR,—In your issue of Oct. 2 a correspondent, signing himself or herself Argus, states that "a doctor working in the Civil Service is, in fact, effectively gagged; he can say or write only what has official approval." Speaking for the Post Office, which is numerically the largest department of the Civil Service and, in ordinary times, as large as, or larger than, all other departments of the Civil Service combined, I should like to say that this gives a wholly misleading impression. The Post Office, as the largest and oldest industrial medical service in the country and probably the world, has kept accurate working life-time sick records of all its employees of all ranks for nearly a hundred years. These have made possible long-distance large-scale observations, many of which have been published. To mention only two, it was largely upon published Post Office medical experience that the non-pathological nature of adolescent albuminuria was established and accepted. More recently, it was largely upon published Post Office medical experience that the futility of quarantine in the case of healthy contacts with the ordinary zymotic diseases was demonstrated. Further, the researches and medical experience of the Post Office have been freely open to—and largely made use of by—welfare and medical officers in outside industry; and everybody in the Post Office has been only too glad that this should be the case.

There has certainly been no gagging of its medical staff, either in the way of research or publication. I cannot speak with equal knowledge of other departments of the Civil Service. I can imagine it possible, for instance, that a medical research into the toxicology of some substance used in industry or munition-making might be temporarily withheld from general publication for quite valid reasons of state, especially in war-time. This is not to comment upon any possible future development of hospital or general medical practice. But I should be surprised to learn from your correspondent that, apart from such possible instances as I have suggested, any valuable piece of medical research work had been deliberately suppressed by the head—permanent or ministerial—of any Civil Service Department.

London, E.C.1. H. H. BASHFORD.

GOING UNDERGROUND

SIR,—Sufficient coal is not being got to maintain the war effort and keep us warm. Men are being returned to the mines from other industries, and miners prosecuted for absenteeism. Recently the best part of a coal-field has been on strike in Nottinghamshire because a surface worker was sent to prison for refusing to go down the pit. Dr. Culpin has drawn attention to the psychological aspects, but there is ever a more important point of view.

While all this is going on, complicated discussions are proceeding about the establishment of a State Medical Service (to which I am, incidentally, whole-heartedly opposed), and it is said that it should be the function of the medical profession to lead the way in the improvement of social conditions, housing, food, and work. Is it not strange that the medical profession has remained so silent on the present mining troubles? If it ever is to fulfil the function of leading the way to a New World, then doctors should speak now.

Apart from your excellent leader (*Lancet*, 1942, i, 417), I can remember no pronouncement on the miner's burden, but there must be doctors far better acquainted with the mining industry than I, who could quickly point out the root of the present troubles. If this letter succeeds in stimulating them to speech or to writing, its object will be attained.

It seems almost pathetic that the two basic industries of this country, the Merchant Navy and coal, should have been, and are, so neglected. Today the average miner says, and means, "My child shall not go down the pit." Why? Because he knows the appalling working conditions, the risks to life and limb, and the hopelessness of an injured man obtaining work elsewhere. Any improvement in miners' working conditions, or any advance in wages, have only been obtained after a bitter struggle between employees and employer. Surely, before miners are prosecuted for absenteeism, attempts should be made to improve the working conditions of the miner and the conditions under which he lives in the mining villages, and to restore trust between the two sides of the industry.

Perhaps this is being done. If it is, let us hear about it, and let us hear the views of those doctors who are in close contact with mines and miners.

Southwell, Notts. T. A. LLOYD DAVIES.

INTRAPERITONEAL SULPHONAMIDES

SIR,—Your leading article of Sept. 25 will, I hope, stimulate British surgeons to greater interest in a valuable adjunct to the treatment of the infected peritoneum. Little has been published in this country on the use of sulphonamides in the peritoneal cavity and more experimental work is necessary to establish such treatment. I have employed sulphapyridine in most of my cases; sulphanilamide and sulphathiazole have not given me nearly such good results in cases of intraperitoneal infection. The inevitably contaminated abdominal wound has nearly always healed by first intention in my experience which now extends over two and a half years. The risk of jaundice or other intoxication appears to be negligible, provided enough fluid is taken, and the peritoneal dose need not be supplemented by oral or other routes. Doses up to 25 g. are safe and the presence of the drug in the blood-stream seven days after administration testifies to its slow absorption. But, as you rightly emphasise, this new chemotherapy is not a panacea for all ills and must not replace scrupulous surgical technique.

Aylesbury. R. H. GARDINER.

MITES IN TABLE SALT

SIR,—A woman in this district purchased a packet of table salt which she took home and from it filled the salt-cellar. She thought that somehow she had inadvertently mixed pepper with the salt, until to her horror she saw the pepper heaving and drifting along the surface. There were thousands upon thousands of mites, tyroglyphidæ of some sort, but how or why they invaded the salt is a mystery. Various species, all much alike, do at times infest cheese, flour, sugar, dried fruits and so on, but I can find no record of them being found in salt. They are pale, soft-bodied and eyeless with prominent cheliceræ and a few long bristles, the larger ones with faint magenta staining of the head and feet. No other package of salt had been invaded and each had apparently been packed ready for sale by the manufacturer or wholesaler in grease-proof paper bags enclosed in cardboard containers. This season has been beneficent to all pests and it may have encouraged an adventurous order of the arachnida to a too dangerous exploration as the mites all died in the salt two days afterwards.

A. G. G. THOMPSON,
Lambeth, S.W.2. Medical Officer of Health.

DR. WILLIAM PASTEUR

SIR,—In the obituary tributes to the late Dr. William Pasteur in your issue of Sept. 18, his chief claim on posterity—namely, that he discovered, described and put on the map of medicine for all time the condition known as massive collapse of the lung—is not made clear. I am sure that all those who served with or under him would wish that this, his outstanding achievement, should be permanently associated with his name.

Harley Street, W.1. VICTOR BONNEY.

FIRST AID FOR FRACTURE OF LOWER JAW

SIR,—Lieut.-Colonel Moir calls attention to the need of knowledge on first aid for fracture of the lower jaw, and the points he makes will be agreed to by maxillo-facial surgeons. I would suggest two brief modifications.

1. To the words "Irregularity in the line of the teeth" I would like to add "possibly only detectable when the jaws are approximated."

2. I would like it made clear that when a casualty is

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carried by stretcher he *must* be carried feet first in order that the rear stretcher-bearer may constantly observe his condition.

Oxford. D. S. HAYTON-WILLIAMS.

INFLAMMABILITY OF TRICHLORETHYLENE

Mr. C. LANGTON HEWER writes:—In a paper read last May before the section of anæsthetics, RSM, I stated that "trichlorethylene vapour will not burn or explode if mixed in any proportion with air, oxygen or nitrous oxide." It appears, from research recently carried out by the Bureau of Mines, Pittsburg, USA, that this statement is true only if the temperature does not exceed 25·5° C. [78° F.]. At higher temperatures, if the vapour is mixed with air enriched with oxygen, or with pure oxygen, the mixture can under certain conditions become inflammable. So far as I know, there are no data relative to the inflammability of nitrous oxide, oxygen, trichlorethylene mixtures at high temperatures, but the matter is being thoroughly investigated by I.C.I. Ltd. Pending the publication of their report it would seem wise to use 'Trilene' mixed with air only, if there is any risk of a source of ignition coming into contact with the anæsthetic gases.

Corrigendum.—In our issue of July 10, p. 58, the letter signed Thomas James was in fact sent by Squadron-Leader Theodore A. James, MB.

Obituary

RICHARD AUSTIN FREEMAN

MRCS, LSA

Dr. Austin Freeman, who died at Gravesend in his 82nd year, qualified in 1886 from the Middlesex Hospital, where he was house-physician. For twenty years, on and off, he worked in Africa on the Gold Coast, accompanying a mission to Ashanti and Bontuku as medical officer, naturalist and surveyor, and later being appointed a member of the Anglo-German Boundary Commission for Togoland. In 1892, after being invalided home with blackwater fever, he entered general practice and later became medical officer to Holloway Prison and acting assistant MO to the Port of London Authority. In 1901 his health forced him to give up medicine for authorship and some of "Dr. Thorndyke's" best years followed. He served in command of a field ambulance in the RAMC (T) during the last war, remaining on the active list till 1922. His works included a book on Ashanti and Jarman, and *Social Decay and Regeneration* published in 1921; but it is in Dr. Thorndyke's laboratory that his colleagues will miss him. He was a freeman of the Society of Apothecaries and was elected to the livery in 1929. He married in 1887 Annie Elizabeth Edwards; they had two sons.

ALAN FORD SMITH

B M OXFD, M B C P; CAPTAIN RAMC

THE death of Dr. A. Ford Smith while serving in the Middle East is announced. He entered the London Hospital with an open scholarship in 1934 from Lincoln College, Oxford, after gaining a first in the honours school of physiology, and as a student gained many hospital prizes. He was a student demonstrator of anatomy in the medical college, and after qualifying in 1937 he became house-physician to the medical unit and to the department of physical medicine, and assistant in the pathology department. Later with a Nuffield research scholarship he returned to Oxford to work under Professor Witts until on the outbeak of war he joined the RAMC. J. B. writes: "Human beings were Tommy Ford Smith's chief interest and being so human himself he made friends in all walks of life. He looked only for simplicity of heart in his fellows and had no use for pretentiousness. He could master in an hour a subject with which his friends might wrestle for days, but he never minded when like vultures we used to pick his brains. He seemed to have read everything, but he carried his knowledge of literature and art with easy grace and no trace of pomposity. The intelligence, gaiety and charm that were housed in Fordie's lanky and picturesque form will be remembered by all who knew him."

MEDICAL RELIEF IN FREED EUROPE

THE "challenge to medical sciences" which occupied countries will offer when they are freed was discussed in London last Saturday at a conference convened by the Association of Scientific Workers, with Dr. DOUGLAS MCCLEAN in the chair.

Dr. A. MARTEAU, who lately left Belgium, said that within three months of the Nazi occupation the situation in that country was worse than at the end of 1917. Today people who are not wealthy—i.e., the large majority—subsisted on a daily ration of ½ lb. bread, a few potatoes, very little in the way of vegetables, and exceptionally a tiny piece of meat. The result was a general loss of weight, lower resistance to physical and mental strain and to infection, and a reduction in the birth-rate. Reassuring statistics published under the authority of the Germans or of quislings were valueless. The only means of true relief was victory: to send food to Belgium now would ultimately be to help Germany, though an exception might possibly be considered for the children. To bring relief after the war a few units from the USA and Britain would not suffice. Help must be found in the country itself, and distribution should be entrusted to the local authorities once these have been purged. The political aspect of this major problem must not be allowed to paralyse all action. In certain quarters political considerations and social prejudice predominated. Belgian resistance, however, had not given way to threats or oppression; nor would it be disposed to accept, in any form, a dictatorship of corned beef and condensed milk. Much had been said of unconditional surrender. The peoples starved by Hitler would accept only one kind of relief—unconditional relief.

Dr. V. KRUTA, of Czechoslovakia, spoke of the urgent need to provide food for people in concentration and other camps and ghettos who would be faced with starvation on the collapse of the Nazi administration. The enormous movements of population would create many problems.

Dr. A. P. CAWADIAS explained how the worst of the famine in Greece was relieved by supplies of British and American food after April 1942. But the effects of famine, he said, do not cease with the arrival of food. An epidemic of typhus in Athens gave warning of what was to come, and continued malnutrition had brought a terrible increase in disease, including malaria, tuberculosis and hunger œdema. Against the consequences of malnutrition "we shall have to fight for a whole generation."

Prof. A. SARKISOV described the devastation wrought in the USSR by the invaders and the measures taken to meet the immense need arising from it.

Prof. J. R. MARRACK, speaking on present plans, said that relief was not confined to food; its object should be to set peoples on their feet again, and this meant that railways and factories must be set working and that livestock, seeds and raw materials must be supplied—on a basis of lend-lease rather than charity. After the last war surplus stocks of food were sent to Europe, and this benefited American farmers. But these supplies of foods that happened to be surplus were inadequate, and physiological needs were now better understood. The actual amounts that would be required were small in comparison with total consumption in, for example, the USA. Rationing could provide enough of certain foods that otherwise would be short. Relief might prove to be the beginning of an internationally controlled consumers' economy.

OPHTHALMOLOGICAL SOCIETY OF EGYPT.—To encourage scientific ophthalmic work this society has instituted a prize which will be awarded each year for the best essay submitted at its congress. The competition is open to all members of the society who have been in practice for less than 20 years. Further particulars may be had from the secretary, 42, Kasr El Ainy Street, Cairo.

ROYAL SANITARY INSTITUTE.—A meeting will be held at the Royal Leamington Spa on Saturday, Oct. 16, at 10.30 AM, when Mr. E. H. Doubleday, regional officer for the Ministry of Town and Country Planning, will read a paper on town and country planning and health.

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"RELIGIO MEDICI"

A TERCENTENARY TRIBUTE

DOUGLAS GUTHRIE, M D EDIN, F R C S E

Sir Thomas Browne's *Religio Medici* (The Religion of a Physician) can be classed neither as a medical nor as a scientific work, yet it occupies a unique place in literature because of the perennial freshness of its message and the delightful manner and style in which that message is presented. It has had many imitators. All manner of "religios" have appeared, pertaining to numerous callings. Thus we have *Religio Clerici*, *Religio Jurisprudentis* and such-like publications; but none of them can match the original model.

Many men of letters have paid homage to Sir Thomas Browne. Coleridge, Lamb, Lowell, Johnson and many another has acknowledged his influence, and in our own day Sir William Osler has done much to revive the peculiar attraction which the *Religio* must ever hold for the medical man. Needless to say, Browne has also had his critics since the fashion was set by the dreary Aberdonian philosopher, Alexander Ross, whose *Medicus Medicatus or the Physician's Religion cured by a lenitive or gentle Potion* only added to Browne's popularity. Sir Kenelm Digby's *Observations upon Religio Medici* did still more, and thereby hangs the tale of the publication which may be here retold.

THE STORY OF THE FIRST EDITION

Dr. Thomas Browne, the son of a mercer of Cheapside, London, had studied in Oxford, spent three years in the medical schools of Padua, Montpellier and Leyden, had commenced practice in Norwich, and had married Dorothy Mileham, before the authentic edition of *Religio Medici* appeared in 1643. Originally written at Shipden Hall, Halifax, just after the author's return from the Continent, it was not intended for the press but was composed as "a sort of private diary of the soul." The writer was still young. "My life, it is a miracle of thirty years," he observes in one place, and in another, "nor hath my pulse beat thirty years." The manuscript was circulated among friends, and frequently copied, as a number of manuscripts still exist although none in Browne's handwriting. The publication of such a document was a temptation too great to be resisted; one of the manuscripts reached a printer in 1642 and was "most imperfectly and surreptitiously published." Worse was to follow, when a copy of the pirated edition was bought by the forceful and versatile Sir Kenelm Digby, then in prison for a political offence. Within 24 hours, if we are to believe him, the prisoner had written and published a review and criticism which caught the public imagination. Browne was now obliged to take action. With characteristic liberality he supplied to the same publisher the corrected edition and thus, early in 1643, *Religio Medici* became available for all readers. The alterations do not appear to have been very extensive. Even the frontispiece of the "surreptitious" edition was used, and has been reproduced many times. It represented a man, falling from a high cliff, caught and rescued in mid-air by a hand emerging from a cloud in the heavens, and it bears the legend "*a cœlo salus.*"

THE "RELIGIO" AND ITS MESSAGE

It is not easy to explain in a few sentences the nature of *Religio Medici*; indeed it is by no means easy to read, for it is a work which must be studied and pondered for many a day before its magic and fascination captures the average reader.

The very title of the book was a paradox when it appeared; the medicus of that day was held to be a sceptic in matters of religion, and the new learning, already in full flood on the Continent and gradually extending to Britain, tended to widen the gulf between religion and science. Yet Browne sets out to state his argument in favour of a wide and liberal interpretation of Christianity, for "those who do confine the Church of God either to particular Nations, Churches or Families, have made it far narrower than our Saviour ever meant it." At the outset the work claims that he "dare without usurpation assume the honourable title of Christian"; but, he continues, "I borrow not the rules of my Religion from Rome or Geneva, but the dictates of my own reason." His views are "not wrung from speculations and subtilties, but from common sense and observation; not pickt from the leaves of any Author, but bred amongst the weeds and tares of mine own brain." He has no antipathy to "Turks, Infidels and Jews," but, for himself, he finds that "there is no Church whose every part so squares unto my Conscience," so "consonant unto reason" and so "framed to my particular Devotion, as the Church of England."

Having said this, he is not prepared to argue further, for he has "no Genius to disputes in Religion," however argumentative he may be in other matters. "In Philosophy, where Truth seems double-fac'd, there is no man more Paradoxical than my self; but in Divinity I love to keep the Road; and, though not in an implicite, yet an humble faith, follow the great wheel of the Church." "As for those wingy Mysteries in Divinity, and airy subtleties in Religion, which have unhinged the brains of better heads, they never stretched the Pia Mater of mine." Like many another man of Science he keeps his Religion in a separate compartment, for "many things are true in Divinity which are neither inducible by reason nor confirmable by sense." Of course he was faced by problems, but he was content merely to state them and to believe that "there is some other hand that twines the thread of life other than that of Nature. I am sure we do not err if we say it is the hand of God." For instance: "For the first chapters of Genesis, I must confess a great deal of obscurity," and "I would gladly know how Moses with an actual fire calcined or burnt the Golden Calf unto powder, for that mystical metal of Gold, exposed to the violence of fire, grows onely hot, and liquefies, but consumeth not."

We are not surprised to find Browne sceptical of Hell, a grim reality in his time. "I thank God," he writes, "that I was never afraid of Hell, nor ever grew pale at the description of that place." "I can hardly think there was ever any scared into Heaven; they go the fairest way to Heaven that would serve God without a Hell." Nor can he "dream that there should be at the last day any Judicial proceeding or calling to the bar as indeed the Scripture seems to imply, and literal Commentators do conceive."

So futile is religious argument, that he considers it would be for the benefit of learning, were it possible to limit the literature of religion to "a few and solid Authors; and to condemn to the fire those swarms and millions of Rhapsodies, begotten only to distract and abuse the weaker judgments of Scholars, and to maintain the trade and mystery of Typographers." One shudders to think how Browne would have regarded the books of today.

As a medical man he must needs refer to the mystery of the soul, stating that "amongst all those rare discoveries and curious pieces I find in the Fabrick of Man, there is no Organ or Instrument for the rational Soul; for in the brain there is not anything of moment more than I can discover in the crany of a beast, and this is an argument of the inorganity of the Soul. Thus we are men, and we know not how; there is something in us that can be without us, and will be after us; though it is strange that it hath no history what it was before us, nor cannot tell how it entered in us."

The Medicus makes further reference to his anatomical studies when he refers to those patients, so well known to every medical practitioner, who "think health an appurtenance unto life, and quarrel with their constitutions for being sick?"; "but I," writes Dr. Browne, "that have examined the parts of man, and know upon what tender filaments that Fabrick hangs, do wonder that we are not always so; and do thank my God that we can die but once." Not content to contemplate such mysteries of Nature as the Tides, the Nile floods, and the Magnetic Ode, he "studied to match and parallel those in the more obvious pieces of Nature, which without further travel I can do in the Cosmography of myself." "We carry with us the wonders we seek without us: there is all Africa and her prodigies in us. . . ." Extending his observations to the animal world, he remarks that "there are no Grotesques in Nature," and "no deformity in any kind or species of creature whatsoever." It is not surprising that he was more intrigued by the habits of insects than

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by such "prodigious pieces of Nature, Whales, Elephants and Dromidaries." There was "more curious Mathematicks" in bees, ants, and spiders, and "the civility of these little Citizens more neatly sets forth the Wisdom of their Maker."

In the second part of *Religio Medici* the author turns from the theme of Faith to that of Charity.

Browne had a truly international outlook which must have been as rare in the 17th century as it is today. His was "a constitution so general, that it consorts and sympathiseth with all things. I have no antipathy, or rather Idiosyncrasie, in dyet, humour, air, any thing. I wonder not at the French for their dishes of Frogs, Snails and Toadstools, . . . but being amongst them, make them my common Viands." "At the sight of a Toad or Viper, I find in me no desire to take up a stone and destroy them." "National repugnances do not touch me, nor do I behold with prejudice the French, Italian, Spanish or Dutch." This he writes at a time when "whole Nations miscall each other by opprobious Epithets" and when scholars wielded pens which "carried farther and gave a louder report than Thunder." "All places, all airs, make unto me one Countrey; I am in England every where, and under any Meridian."

How could men judge aright, with such imperfect knowledge? "No man," answers Browne, "can justly censure or condemn another, because indeed no man truly knows another." How many of us could echo such noble sentiments? Thus he continues, condemning intellectual snobbery, philosophising on sleep and dreams, and discussing the voice of Conscience; "another man within me that's angry with me, rebukes, commands and dastards me."

Browne's experience as a physician leads him to pray, "Let me be sick my self, if sometimes the malady of my patient be not a disease unto me," and to feel "not only ashamed but heartily sorry, that there are diseases incurable; yet not for my own sake, or that they are beyond my Art, but for the general cause and sake of humanity."

LATER LIFE IN NORWICH

No series of extracts from *Religio Medici* can convey the charm and interest of the complete work. It is like a piece of music, which must be played in its entirety to be fully appreciated. Of course Browne had his faults. We find it hard to understand how so saintly a man could write "I have ever believed, and do now know, that there are witches," and could even supply the evidence upon which two unfortunate women accused of witchcraft were condemned to death at Lancashire Assizes in 1635. Perhaps one should rather marvel that in other respects the author of *Religio Medici* held views far ahead of his time. As so often happens, the *Religio*, his first work, was also his greatest. His second, *Pseudodoxia Epidemica* was published in 1646. It was an inquiry into certain "vulgar errors" and is full of quaint and picturesque argument. Did moles possess eyes? Did swans sing whilst dying? Were the legs of the badger shorter on one side so that it could run on the side of a hill? Could the ostrich digest iron? Such are a few of the "errors" discussed in this curious book.

Two other books followed in 1658, *Urn-burial* and *The Garden of Cyrus*. Dr. Browne was a physician of high repute, his large medical practice including such well-known families as the L'Estranges and the Pastons and extending far beyond the city of Norwich. He was also a keen naturalist and archæologist and it was natural that he should be informed of a number of cinerary urns near Walsingham. Yet no-one can regard his book, *Hydriotaphia, Urn-Burial* as a contribution to archæology. The urns are simply the text of a magnificent discourse upon man's mortality. It is strangely ironical that the skull of Sir Thomas Browne, he who had that horror of being "knav'd out of our graves," was on view in the museum of the Norfolk and Norwich Hospital from 1840 until 1922, when it was decently reinterred in the church of St. Peter Mancroft. Browne himself had written, "Who knows the fate of his bones, or how often he is to be buried?" Today he would have been a strong supporter of cremation.

The Garden of Cyrus contains as little of horticulture as *Urn-Burial* does of archæology. Obsessed by the geometrical form known as the "quincunx," the writer wanders on in tantalising fashion, often becoming almost unintelligible, until at the end he rises to the very summit of English prose in a grand peroration.

Of the closing years of Browne's life we have little information. For 46 years he practised in Norwich, but his fame extended throughout the world of letters. He lived in troublous times and was a good Royalist, but he was too wise to dabble in politics. Throughout all the current turmoil, he and his wife Dorothy enjoyed long and happy lives. Edward, the eldest of their ten children, attained a distinction almost equal to that of his father. He travelled far and widely in Europe, and wrote an account of his journeyings, then became a leading physician in London, a fellow of the Royal Society and physician to the king. It was that king who knighted the father during a visit to Norwich in 1671. Charles II was about to confer this honour upon the Mayor, but that honest man informed the king that a more worthy recipient of the royal favour was present in the person of the famous doctor, who thereupon became Sir Thomas Browne.

He died 14 years later, on his 77th birthday. Some twenty editions of the *Religio* had appeared during his lifetime and the book had been translated into Latin, Dutch, German, French and Italian. It has been reprinted many times since then. Although it proclaimed no new discovery, nor even any new idea or method, the influence which it exercised in its day has steadily grown and it continues to attract an ever-increasing circle of devoted readers.

Appointments

COWAN, W. J., MB EDIN.: RSO at Preston Royal Infirmary.
DUNLOP, E. M. N., LRCPE: orthopædic registrar at Warwick Hospital.
GOOD, W. C., FRCSI: RSO at St. Mark's Hospital, London.
HALBERSTAEDTER, MAX, MB LOND., DMR: chief asst. to the radio-therapeutic research dept. at St. Bartholomew's Hospital, London.
HARRIS, E. D., MB LOND., FRCS: temp. surgeon to the ear, nose and throat dept. of the Hampstead General and North-West London Hospital.
ILLINGWORTH-LAW, I., MA CAMB., MRCS: surgical registrar at the Royal Northern Hospital, London.
LEWERS, H. B., DSO, OBE, MB MELB.: examining factory surgeon for Ilfracombe, Devon.
MACLAREN, A. H., MB ABERD.: resident orthopædic and fracture officer at the General Hospital, Nottingham.
MARSHALL, STANLEY, MD LOND.: temp. pathologist at the Bolingbroke Hospital, London.
MCCANN, J. J., MB LOND., MRCP: temp. deputy medical superintendent (class IV) at Pinewood Sanatorium (LCC).
PIGGOT, A. P., MRCS: acting medical superintendent, St. James's Hospital (LCC).
ROBERTSON, J. S., MD ABERD., DPH: divisional medical officer, LCC (mass radiography unit).
ROWLING, DOROTHY E., MB LEEDS: RSO at the Prince of Wales's Hospital, Plymouth.

Births, Marriages and Deaths

BIRTHS

BARBER.—On Sept. 27, at Great Dunmow, Essex, the wife of Dr. Geoffrey Barber—a son.
BREWER.—On Sept. 28, at Luton, Beds, the wife of Dr. H. F. Brewer—a daughter.
CAWTHORNE.—On Sept. 23, at Upminster, the wife of Squadron-Leader J. E. Cawthorne, MRCS—a son.
DICKS.—On Sept. 25, at Harpenden, the wife of Lieut.-Colonel H. V. Dicks, RAMC—a son.
NEUSTATTER.—On Sept. 24, at Beaconsfield, the wife of Major W. Lindesay Neustatter, RAMC—a daughter.
RICHARDS.—On Sept. 30, the wife of Dr. A. M. Richards, of Oxford—a son.

MARRIAGES

CAMPBELL—OSBORN.—On Sept. 17, in Edinburgh, Ian Campbell, captain RAMC, to Joan Carnegie Osborn, 2/sub., ATS.
REID—CARMICHAEL.—On Oct. 2, at Liverpool, Hugh Reid, FRCS, to Sheila Carmichael, MB, captain RAMC.
REITER—MAUGHAN.—On Sept. 25, Tiberius Reiter, MD, to Nancy Maughan.

DEATHS

ALLEN.—On Sept. 26, in Liverpool, James Davison Colquhoun Allen, MB EDIN., of Hoylake and formerly of Bath, aged 76.
COWEN.—On Sept 25, George Hebb Cowen, MB LOND., FRCS, of Newbury, Berks, formerly of Southampton, aged 71.
FRY.—On Sept. 24, at Bexhill, Augustine Cradock Fry, MA CAMB., MRCS, formerly of Stone, Staffs, aged 75.
FULTON.—On Sept. 28, Adam Fulton, MB RUI, of Harrogate, formerly of Nottingham, aged 76.
HEY.—On Sept. 28, at Ripon, Samuel Hey, MRCS, aged 73.
PASK.—On Oct. 4, at The House, Wrightington Hospital, near Wigan, Edward Henry Allon Pask, MD LOND., aged 59.
PRIESTLEY.—On Sept. 21, in Leeds, John Overend Priestley, MRCS, DMRE, formerly of Ballycastle, Antrim.

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Notes and News

THE FAMILY DOCTOR AND PREVENTIVE MEDICINE

SPEAKING at Westminster Hospital medical school on Oct. 4 Mr. ERNEST BROWN, Minister of Health, spoke on the relation of the individual doctor to the organisation of preventive medicine. "Some of the problems involved," he said, "raise broad questions of social policy—housing, agriculture, foreign trade, taxation. On these the individual doctor as citizen has his part to play, a part which in his case cannot fail to be important owing to the professional weight attaching to his views. (And I would put in a plea that the doctor should not ignore or contemn his duties as a citizen in this context. Doctors like other men are, or ought to be, political animals). But as a doctor even more than as a citizen he must be closely concerned with the promotion of health. Some of the profession will, of course, be in contact as experts with environmental problems—the medical officer of health, the bacteriologist. What I have in mind, however, is rather the general practitioner, the family doctor, and his relationship to prevention. Here I am sure there is one reform we must work for, and that is to bring together again the family doctor and those personal preventive services like child welfare and the care of pregnancy, which have tended to develop along increasingly divergent courses. That is one reason why it is so essential to plan for a comprehensive service which provides a family doctor for those many families that have hitherto been without one. Another reason in my view is that the general practitioner can and will have a most important rôle in putting across to the individual citizen the principles of positive health. We are gradually realising in this country the importance of health education, and we are gradually learning more effective ways of catching the ear and the eye of the public at large. But in bringing home to the individual parent or adolescent or child the principles of healthy living there is no method so effective as that of personal contact and individual advice, and no adviser so effective as the family doctor. My hope for the nation's health in the future is therefore that, on the firm foundation of comprehensive curative medical facilities available to every citizen, we shall be able to build a health service with the positive promotion of health as its foremost object; and that the medical profession, no longer engaged almost wholly in a ceaseless struggle to check the ravages of disease, will be free for the first time to occupy its rightful place as the guide of the community in the paths of the truly healthy life."

Royal College of Surgeons of England

Arnott and Erasmus Wilson demonstrations and museum lecture demonstrations are to be held at the college, Lincoln's Inn Fields, London, W.C.2, on weekdays at 4 PM from Oct. 18 to Nov. 5. Prof. A. J. E. Cave is to speak on cerebral and cranial veins, the portal vein and the portal-systemic anastomoses, the major lymphatic trunks, the development and anatomy of the palate, the naso-pharynx and eustachian tube, anatomy of the axilla, the carotid sheath and other fascial structures, tendons and tendon sheaths, and the anatomy of intra-articular structures. Mr. L. E. C. Norbury will also speak on multiple primary malignant growths with special reference to the colon and rectum, Mr. R. Davies-Colley on certain states of bone absorption, Mr. C. E. Shattock on tumours of the kidney, and Surgeon Rear-Admiral Wakeley on tumours of the alimentary tract.

University of Aberdeen

At a graduation on Sept. 29 the following degrees were conferred:

MB, ChB.—William B. Burnett (with first-class honours); R. N. Johnston and M. R. Milne (with second-class honours); J. R. Anderson, R. J. Anderson, Eba C. Baird, Sheila M. Baker, J. B. Bittiner, Hugh Brebner, G. W. D. Campbell, Mary E. Chalmers, G. C. Chessor, Charles K. Clark, Catherine M. Coull, T. C. Cowan, M. M. Craig, Thelma C. Cruickshank, Sheila R. Dalgliesh, W. J. Dawson, R. C. M. Dingwall, G. A. Findlay, D. A. Forbes, A. G. Fraser, I. A. Fraser, Joseph C. Gardiner, Helen E. Gordon, J. B. Gordon-Russell, Charles Grant, Mona Griffin, F. W. Henderson, Valentine M. Husband, I. D. Innes, Kathleen M. Knox, Nancy Laing, Peter Leslie, P. G. McBoyle, D. J. McCombie, Mary G. McDonald, Margaret J. McHardy, A. E. Macintosh, D. G. Mackay, N. R. Mackay, D. N. Mackinnon, A. I. Maclean, W. F. Macleod, Antoinette M. H. MacMahon, Ishbel M. Macrae, J. L. A. McVicker, D. W. Mathieson, Elizabeth H. Milne, C. G. R. More, R. E. P. Nutten, R. A. Peat, H. M. Raffan Sheila T. Ritchie, Marguerite M. Scott, W. G. Shiach, R. G. Simpson, W. D. Sinclair, J. A. M. Smith, A. L. Speirs, A. J. Spence, Laura B. C. Thompson, I. G. Thomson, W. G. Todd and D. E. Walker.

Medical Honours

The following awards have lately been made to medical men:

GM.—Surgeon Lieutenant P. R. C. Evans, MB LOND., RNVR, for gallantry in services to the wounded after his ship had been damaged by an explosion. Enduring great pain and with both his ankles broken, Evans continued to tend the wounded for many hours.

DSC.—Surgeon Lieutenant R. H. Jones, MB, RNVR, for courage and resolution in pressing home a successful attack on enemy forces in enemy coastal waters.

RNVR Officers' Decoration.—Surgeon Commander W. T. R. Chapman, MRCS, and Surgeon Lieut.-Commander S. B. Levy, LRCP.

Mentioned in despatches.—Group-Captain C. J. S. O'Malley, MB LOND., W. J. G. Walker, MRCS, Wing-Commanders R. M. Outfin, LMSSA, and H. L. Willcox, MB NZ, Squadron-Leaders, J. A. Mains, LRCPE, M. O. Richardson, MRCS, P. A. Gimson, MRCS, and J. F. Houlihan, MB NUI.

The King has given authority to Dr. S. Avery Jones, medical officer in the Arab Legion, to wear the insignia of the fourth class of the order of El Istiqlal which has been conferred on him by the Amir of Trans-Jordan.

The President of the Republic of Poland has appointed Wing-Commander H. P. R. Smith MB CAMB., RAF, to be an officer of the Order of Polonia Restituta.

Medical Prisoners of War

The following officers have been posted as prisoners of war:

RAF Medical Branch (in Japanese hands).—Wing-Commander Donald Magrath, MB BIRM., Flight-Lieutenants D. A. Duthie, MB EDIN., F. A. Forbes, MB ABERD., C. B. I. Willey, BM OXFD, F. R. Philps, MB LOND., A. F. Rutherford, MB EDIN., R. R. McSwiney, MB BOND., L. C. Liddell, MB ABERD., B. A. Stoll, MRCS., H. J. Knox, MB BELF., R. G. Blackledge, BM OXFD, John Simpson, MB., P. J. Connolly, LRCPI, B. L. N. Morgan, MRCS., John Lillie, MB BELF., R. J. S. Wilson, MB DUBL., F. W. Parke, MB DUBL. and Maurice Kinmonth, MB LOND.

RAMC.—Lieut.-Colonel J. C. Collins, MRCS, Captain E. H. Markby, MRCS, Lieutenant E. C. Vardy, MD DURH., Captain R. B. Wallace, DSO, MC, MB GLASG., and Captain R. B. C. Welsh, MB EDIN.

University of Istanbul

Dr. Tevfik Sağlam has been appointed rector of the University of Istanbul.

Sağlam, who was born in 1882 in Istanbul, graduated from Askeri Tibbiye (Military Medical School) when he was 21. He served as army hospital doctor in both the Balkan and the World War and was promoted to the rank of general. After working as chief doctor in Gülhane Hastahanesi and as inspector of internal diseases during the Istiklal Harbi (War of Independence) he became a professor in the faculty of medicine. He gave up teaching in 1934 to practise as a specialist of internal diseases till last year he became third ordinary professor of internal diseases in the faculty of medicine at Istanbul.

Paddington Medical Society

A meeting will be held on Tuesday, Oct. 12, at 8.45 PM at St. Mary's Hospital, Paddington, W.2, when there will be a discussion on problems confronting the medical and pharmaceutical professions in war-time.

Infectious Disease in England and Wales

WEEK ENDED SEPT. 25

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 2772; whooping-cough, 1480; diphtheria, 757; paratyphoid, 14; typhoid, 3; measles (excluding rubella), 466; pneumonia (primary or influenzal), 356; puerperal pyrexia, 149; cerebrospinal fever, 49; poliomyelitis, 8; polio-encephalitis, 2; encephalitis lethargica, 4; dysentery, 270; ophthalmia neonatorum 70. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Sept. 22 was 1828. During the previous week the following cases were admitted: scarlet fever, 246; diphtheria, 44; measles, 12; whooping-cough, 39.

Deaths.—In 126 great towns there were no deaths from measles, scarlet fever or enteric fever, 13 (1) from whooping-cough, 11 (2) from diphtheria, 61 (10) from diarrhœa and enteritis under two years, and 9 (1) from influenza. The figures in parentheses are those for London itself.

Liverpool and Birmingham each reported 5 deaths from diarrhœa.

The number of stillbirths notified during the week was 197 (corresponding to a rate of 31 per thousand total births), including 23 in London.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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THYROTOXICOSIS TREATED WITH THIOUREA

H. P. HIMSWORTH, MD LOND, FRCP
PROFESSOR OF MEDICINE, UNIVERSITY OF LONDON; DIRECTOR OF MEDICAL UNIT, UNIVERSITY COLLEGE HOSPITAL

IN a recent publication Astwood (1943) reported the pronounced beneficial effects of thiourea and thiouracil in cases of thyrotoxicosis. According to him thiourea, in doses of 1–2 grammes daily, or thiouracil, in doses of 0·2–1 g. daily, caused, in the space of a few weeks, the disappearance of the thyrotoxic symptoms to such an extent that the patient could resume his normal activities and continue in good health as long as the drug was continued. After the administration of the drug there was a latent period of one to two weeks before the pulse began to fall. Thereafter it fell steadily towards normal and coincidentally the weight increased, symptoms of thyrotoxicosis abated, the basal metabolic rate fell and the blood cholesterol rose. As long as the drug was continued this improvement persisted but on omission of the drug the signs of thyrotoxicosis returned only to disappear again on the resumption of treatment. So far, in the considerable number of cases tested, no toxic effects of these drugs have been noted and no contra-indication found to the continuance of the therapy for long periods. Further experience alone will show if thiourea and thiouracil are as innocuous as present experience suggests and also what the ultimate result of this treatment will be. The results at present available, however, are so striking as to indicate that in these drugs we have obtained therapeutic agents for the treatment of thyrotoxicosis superior to any we have hitherto possessed. The purpose of this paper is to report the full confirmation of Astwood's claims for the initial effects of thiourea on cases of thyrotoxicosis. Six cases have been treated, but it will suffice to report the effect of the therapy on one of the most severe.

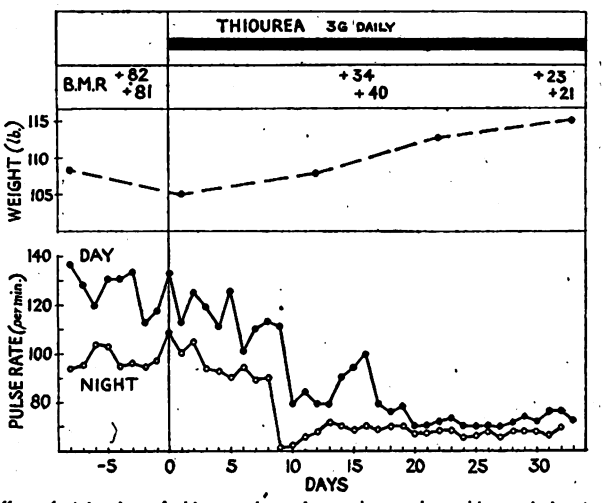
ILLUSTRATIVE CASE

A young married man, aged 31, employed in a responsible position as the manager of a coal depot, was discovered to have thyrotoxicosis two years ago. He was treated with small doses of iodine and this treatment continued until his admission to hospital. For some months after beginning iodine he felt better but in March, 1943, he contracted a respiratory infection and since then his symptoms have progressed rapidly. In this period his weight fell from 10 st. 7 lb. to 7 st. 8½ lb., despite the fact that his appetite was better than ever. He became irritable and nervous. The slightest exertion tired him and brought on palpitations. Sweating was pronounced so that during the day he would change his underclothes two or three times. Tremor of the hands appeared and was sufficient to incommode him. At night he could not sleep and he was troubled by consciousness of the rapid beating of the pulse in his head. Throughout this period he was having frequent and loose stools. Some weeks before admission his eyes became inflamed and he took to wearing dark glasses.

On admission the patient presented the classical signs of severe Graves's disease. He sat in bed tense and apprehensive. His movements were characterised by eagerness and excessive energy. The skin over the whole body was flushed and bedewed with sweat, there was a conspicuous tremor of the outstretched hand and the pulse was racing, but regular, at 150 a minute. His staring eyes attracted attention. The sclerotic was visible all round the cornea. He was found to have well-marked retraction of the upper lid and protrusion of the eyeball. The conjunctival vessels were injected and there was an angular chemosis. Apart from a slight restriction of upward movement the eyeball moved normally. The thyroid gland showed a moderate diffuse enlargement which was easily visible in the neck, but there was no evidence of pressure on the trachea. The gland was firm in consistency as would be expected after long-continued iodine therapy.

The man's condition was so severe that the advisability of giving considerable doses of iodine immediately was debated but it was eventually decided to use sedatives only and he was given 15 minims of liq. morph. hydrochlor. four-hourly. For 8 days the man's state continued unchanged, and in this period two estimations of the basal metabolic rate gave values of + 81% and + 82%.

On the 9th day after admission the morphine was discontinued and administration of thiourea, 1 gramme three times a day, was begun. The results of this therapy are shown in the figure. It will be seen that it was not until the 11th day after thiourea was begun that there was a significant decline in the waking and sleeping pulse-rates. Thereafter they declined rapidly and by the 18th day both reached normal levels. The rates remained normal for the remainder of the period of observation, even though the patient was allowed up and about. Before the commencement of this therapy his weight was still falling, but after 33 days of therapy he had gained 9 lb. By the 15th and 16th days the basal metabolic rate had fallen to + 34% and + 40%; by the 31st and 32nd day it was + 23% and + 21%. In the same period the blood cholesterol had risen from 110 mg./100 ml. to 225 mg./100 ml. But the most striking effect of the therapy was on the man's clinical condition. By the end of the period a casual observer would not have noticed that he had thyrotoxicosis. His whole manner had changed; he was calm, collected and deliberate in his movements. The flush had left his skin; he



Effect of giving 1 g. of thiourea three times a day on the waking and sleeping pulse-rate, the weight, and the basal metabolic rate of patient with thyrotoxicosis.

no longer sweated and even the palms of his hands were dry. The tremor had disappeared completely. The staring eyes were no longer obvious. The lid-retraction had gone, as also had the conjunctival injection, but on closer inspection it could be seen that the degree of exophthalmos was not significantly less. The goitre was softer—a finding explicable by the abstention from iodine—but it had not decreased in size, and indeed measurement of the neck suggested that it was a little larger.

COMMENT

The results in the other cases were similar, but because of the milder nature of the disease less dramatic. All showed a latent period before the thiourea came into action and on the whole the decline in pulse-rate was more gradual. On discharge from hospital the dose in each case has been reduced to 2 g. a day and no relapses have occurred. It is probable that further reduction in dosage will be possible. One case underwent thyroidectomy because the goitre was compressing the trachea. In this case thiourea alone was given and proved a satisfactory preoperative preparation. It is noteworthy that the tissue removed at operation was hyperplastic and practically free from colloid.

Only two disadvantages of this treatment have been found and these have proved trivial. Thiourea has a nauseating taste and at the beginning of therapy considerable nausea or even vomiting may occur. In each case this has disappeared on persistence with the treatment. These symptoms occurred, though to a less extent, when the drug was given in gelatin capsules. The second disadvantage is the peculiar sweet smell which it imparts to the breath. This appears to be more unpleasant to the observer than to the patient. Blood-counts taken during the course of treatment have shown no indications of agranulocytosis, and the blood-urea remained at normal levels.

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As yet thiouracil has not been available for clinical trial. The dosage of this substance advised by Astwood is less than that for thiourea, and since its taste is much pleasanter it may prove to be the drug of choice in this condition.

MODE OF ACTION OF THIOUREA

The discovery of the action of thiourea on the thyroid gland was unexpected and for that reason the more credit is due to its discoverers for their alertness and the promptness with which they recognised the significance of their observations. J. B. and C. G. Mackenzie and McCollum (1941) were studying the effect of sulphaguanidine as an intestinal disinfectant and came to investigate its toxicity to the rat. They noted that animals dying after sulphaguanidine showed goitres and that on section the thyroid tissue showed hyperplasia and loss of colloid. This work was soon confirmed and it was further shown that other sulphur compounds, notably thiourea and thiouracil, had a well-marked goitrogenic effect (Richter and Clisby 1942). By a curious coincidence another group of workers arrived at the same conclusion from an entirely different starting-point. Kennedy and his colleagues in New Zealand were investigating the action of rape seed in producing goitre, and Kennedy (1942) was led to try the effect of allyl-thiourea. He discovered that it was actively goitrogenic. Since these discoveries, work to elucidate the mode of action of these thio compounds has been actively pressed forward. The results of these investigations have now been published (Mackenzie and Mackenzie 1943, Astwood et al. 1943) and throw considerable light on the matter.

When thiourea is given to rats two groups of effects are found: hypothyroidism and goitre. Clinically the animals show evidence of hypothyroidism by a falling basal metabolic rate, deceased growth and development, and a reduced appetite. Histologically the enlarged thyroid glands show hyperplasia and lack of colloid and resemble tissue from human cases of thyrotoxicosis. The classical work of Marine (1935), however, has shown that this histological picture does not necessarily indicate thyrotoxicosis; rather it should be interpreted, in the normal animal at least, as meaning that the thyroid gland is producing insufficient of the thyroid hormone for the needs of the body and is being stimulated to hyperplasia to remedy the deficiency. For example, Marine showed that such hyperplastic glands occurred in animals on an iodine-deficient diet and that their histological picture reverted towards normal when iodine was given. The explanation put forward is that on the deficient diet the tissues suffered from lack of the iodine-containing hormone; normally such a state is corrected through the agency of the thyrotropic hormone of the anterior pituitary gland which stimulates the thyroid gland to become hyperplastic and more active. But even a hyperplastic thyroid cannot manufacture the thyroid hormone without iodine, and so the stimulus continues and the hyperplasia intensified. When under such conditions iodine is given, the thyroid hormone is produced in quantity, the stimulus to hyperplasia of the thyroid abates and the gland reverts to its "resting" state.

It can easily be seen that the clinical state of hypothyroidism in association with a hyperplastic thyroid gland, such as occurs after administration of thiourea to normal rats, could be explained on the basis that thiourea neutralised the action of thyroxine in the body tissues. But such an explanation is immediately disproved by the observation that thyroxine has a normal action in animals under the influence of thiourea. It has also been shown that the condition of thyroid hyperplasia following administration of thiourea differs from the hyperplasia of iodine deficiency in that administration of iodine does not result in its disappearance and a return of the gland to the resting state. The question now arises: Is the hyperplasia of the thyroid tissue following treatment with thiourea mediated, as are other experimental thyroid hyperplasias, by the anterior pituitary gland? That this is the case is shown by the fact that hyperplasia after thiourea does not occur in hypophysectomised animals. It appears, therefore, that excessive secretion of thyrotropic hormone of the anterior pituitary gland occurs in animals treated with thiourea. We know, however, that when thyrotropic hormone is injected into normal animals it not only produces hyperplasia of the thyroid but also the condition of hyperthyroidism. The problem is why the hyperplasia after thiourea, which is apparently brought about by the agency of the thyrotropic hormone, is associated with hypothyroidism. The answer is given by the observation that thiourea prevents the development of hyperthyroidism which normally follows injection of this hormone while not preventing the hyperplastic effect of the thyrotropic hormone on the thyroid gland. The suggestion follows that thiourea prevents the synthesis of the thyroid hormone. Experimental evidence supporting this view has recently been produced by Geish (personal communication quoted by Mackenzie and Mackenzie 1943), who has shown that the colloid in the thyroid glands of animals treated with thiourea differs from normal thyroid colloid in being devoid of iodine.

These considerations provide theoretical grounds for suggesting the ultimate effect of treatment with thiourea. Marine (1935) has shown that hyperplasia of the thyroid gland, if unrelieved, ultimately gives way to atrophy with consequent hypothyroidism. It is possible therefore that long-continued administration of thiourea to human cases of thyrotoxicosis, in that it does not tend to diminish the hyperplasia but on the contrary has theoretical possibilities of intensifying it, may tide the patient over until atrophy of the gland supervenes and the state of thyrotoxicosis is thus cured by destruction of the source of the thyroid hormone.

SUMMARY

The claims of Astwood regarding the strikingly beneficial effect of thiourea on cases of thyrotoxicosis have been confirmed in six cases, so far as the initial effect of the drug is concerned.

The evidence at present available indicates that thiourea acts by interfering with the synthesis of the thyroid hormone.

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STERNAL PUNCTURE IN THE DIAGNOSIS OF MALARIA

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IT has been recognised for some time that examination of the sternal bone-marrow may help in the diagnosis of malaria, but the full value of this relatively simple procedure does not seem to be appreciated. This initial series of 105 cases may draw attention to its value and limitations as a diagnostic method.

METHOD

A sternal-puncture needle is unnecessary, a stout lumbar-puncture needle serving satisfactorily. It may if desired be cut down to about 2 in. and an adjustable stop with fixing screw can be fitted over the needle. All danger of serious penetration of the mediastinum can equally well be avoided, however, by means of a "distance piece" of glass or metal tubing, with a protective rubber buffer at each end, through which the needle is inserted, leaving only ½ in. of free needle. When it is used for diagnostic purposes only it is not essential for the needle to be perfectly dry, so that any of the recognised methods of sterilisation suffices. No premedication is required, and with suitable local anæsthesia only minor discomfort is experienced by the patient, who should be lying flat, on a firm bed without a pillow.

The site is the centre of the sternum, at the level of the second interspace, easily localised just below the angle of Louis. The needle is inserted vertically through skin and subcutaneous tissue to bone and firmly pressed through the cortex with small to-and-fro rotating movements, the butt resting on the thenar eminence and the needle being steadied

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with the index finger. The resistance decreases distinctly when the marrow is penetrated. The stilette is then removed and 0·5–1 c.cm. of marrow fluid aspirated. Films may be made directly or the fluid ejected into an oxalated tube and examined within half an hour.

Various other satisfactory methods of sternal puncture have been described, but the only one comparable in its simplicity is that originally described by Arinkin, in which a spinal-puncture needle is inserted directly into the sternal marrow through the angle of Louis. The needle is inserted at an angle of 30° to the sternum and allowed to penetrate 0·5–1 cm. into the marrow cavity.

Properly prepared films, stained by a Romanowsky stain, covered with a thin layer of immersion oil and examined with the ⅙ in. dry lens and a no. 2 ocular is the method of choice. Ring and other forms are easily detected and any suspicious object can be quickly scrutinised by the $\frac{1}{12}$ in. oil-immersion lens. Long and tedious search of films is often necessary before any decision can be made, and preliminary examination of thick-drop preparations is often helpful. The value of the thick-drop method lies in the relative rapidity with which the probable result can be reached. In the present series no positive result was reported until search of marrow films had confirmed the thick-drop findings. In the films, no extracellular form was recognised as diagnostic.

PRELIMINARY EXPERIMENTS

To obtain a picture of the findings in the sternal marrow fluid in malaria, sternal puncture was performed in 10 cases with parasites in the peripheral blood. Counts were made of the relative numbers of erythrocytes containing parasites in peripheral blood and in marrow fluid, from films prepared simultaneously.

TABLE I—BLOOD FILMS AND MARROW FILMS COMPARED

Blood		Sternal marrow		
Parasite-containing reds in 5000 cells	Forms	Parasite-containing reds in 5000 cells	Predominant forms	Other evidence of infection
P. falciparum (%)		(%)		
0·4	Rings	1·9	Rings	Pigment; phagocytosed remains
0·8	Rings	1·6	Rings	..
0·85	Rings	1·4	Rings	Phagocytosed remains; sch.
0·26	Rings	0·4	Rings	..
0·75	Rings	1·15	Rings	Phagocytosed remains; pigment
P. vivax (%)		(%)		
0·06	Troph.; gam.; sch.	0·095	Troph.; gam.; sch.	Phagocytosed remains
0·35	Rings	0·85	Rings; sch.	..
0·9	Troph.	1·1	Troph.	Pigment; gam.
0·08	Troph.; gam.;	0·13	Troph.; gam.;	..
0·7	Troph.	1·1	Troph.	..

Troph. = trophozoites; gam. = gametocytes; sch. = schizonts.

Table I shows that the marrow fluid in each case contained a substantially higher proportion of parasite-containing cells. I realise that these proportions are not necessarily applicable when parasites are very scanty, but it is reasonable to assume that any change will be in favour of a higher proportion in the bone-marrow.

DIAGNOSTIC SERIES

Sternal puncture was performed in the 95 cases described below only when serial thick drops taken at six-hourly intervals had proved negative. In all cases further blood thick-drop examinations were made at the time of the sternal puncture, and in 10 cases, blood concentrates, prepared by Bass and John's method of repeated centrifugalisation, were examined. In one case only was a positive finding recorded and that in a case positive to sternal puncture. It was not considered justifiable to subject the patients to the intravenous injection of adrenaline in saline or to other severe provocative measures; but of 12 cases in which subcutaneous injection of 1 c.cm. of adrenaline had been tried with negative result 3 proved positive on sternal puncture. In a further 5 cases with negative sternal puncture, later injection of adrenaline and examination of serial thick drops at half-hourly intervals, gave no positives (table II). It is evident from the figures that examination of sternal marrow fluid is significantly more efficient than the other methods tested.

TABLE II—RESULTS OF DIFFERENT METHODS COMPARED

—	Examination			
	Thick-drop	Concentration methods	Provocative adrenaline	Provocative adrenaline after sternal puncture
	At time of sternal puncture			
Cases	95	10	10	5
Positives ..	1	1	0	0
Positives by sternal puncture	39	6	3	..

This series of 95 falls naturally into two main groups. Into the first group are those cases which clinically merit a diagnosis of malaria, but in which repeated examination of the peripheral blood has shown no parasites. Most of this group consists of patients who have been taking suppressive quinine until admission or shortly before. In such cases it is not uncommon to find that parasites appear in the blood, if they appear at all, only after one, two, or more days in hospital under observation. Sternal puncture elucidates the diagnosis in most of these cases. Of the 6 cases with negative sternal puncture diagnosed and treated successfully as malaria, 2 have been on full antimalarial treatment for 30 and 40 hours before sternal puncture was performed.

The second group consists of clinically atypical cases, having a history of exposure to infection, not necessarily recent, in whom routine examination of the peripheral blood has proved negative. Patients in whom latent malaria is wakened to activity, but is completely overshadowed clinically by some superadded disease, form a subgroup worthy of separate mention; 3 cases of this type are included in the series; 2 had been on suppressive quinine until admission and this may explain the absence of malaria parasites in the peripheral blood. The findings in the two main groups were as shown in table III.

TABLE III

	Clinically malaria	*Clinically atypical*
Cases	35 ..	60
Average age (years)	26·4 ..	25·4
Negative thick-drop examinations (average no.)	6·6 ..	6·0
Positive sternal punctures	26 ..	13
Average time before temp. fell after treatment in + ve cases (days)	2·8 ..	3·5
Negative sternal punctures	9 ..	47
Negatives treated successfully with quinine	6 ..	2
Negatives diagnosed otherwise	3 ..	45

CLINICAL PATHOLOGY

Only those bone-marrow findings of significance in the diagnosis of malaria will be discussed. With one exception, in which pigment was the sole positive finding, only those forms commonly present in the peripheral blood were diagnostically important. Intracellular pigment particles, other phagocytised sporozoal remains, and the more mature trophozoite forms and schizonts of *P. falciparum* were disappointingly scanty. Phagocytosed parasites were seen only in the preliminary series, with relatively heavy blood infection and in 3 cases of the diagnostic series.

It is probable that removal of marrow by trephine would consistently reveal mature forms of *P. falciparum* as well as evidence of parasite destruction, but this small advantage does not justify the more elaborate technique which it would entail. The findings in relation to the clinical picture at the time of sternal puncture are beyond the scope of this article, but it is of interest to note that no malignant tertian gametocytes were found in the sternal-marrow fluid of the cases of subtertian malaria in the series, though in a proportion their presence was expected. This finding is in accordance with Plehn's statement that these forms are few in

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number in malaria in the tropics, though often seen in such cases in England.

Marrow reticulocyte and differential counts, using supravital staining methods, have not been proved to hold any advantage over the corresponding peripheral blood examinations. Actively motile primitive monocytes were seen in one case with a blood mononucleosis of 19%. The significance of this finding is at present obscure. Fresh wet films of sternal marrow fluid were examined in each case but this method was found of little diagnostic value when parasites were scanty.

Artefacts.—Marrow films contain numerous small protoplasmic masses which superficially resemble sporozoa. Platelets, many aberrant in form, are more numerous than in the peripheral blood and are a fruitful cause of difficulty. Singly they may resemble rings or the gametocytes of *P. falciparum* and in clusters merozoites. A Howell-Jolly body, by no means a rare finding in the marrow, if lying towards the edge of a ring-stained erythrocyte is easily mistaken for the chromatin of a ring form. Basophilic red cells, often large, irregularly stained and stippled may present puzzling appearances and resemble erythrocytes containing Schuffner's dots and badly stained trophozoites. Rounded-off portions of disintegrated myeloid cells containing small reddish-staining particles or clusters of swollen and degenerated myeloid cell granules may on first inspection be interpreted as stages in the development of schizonts. The non-specific nature of these artefacts is usually easily recognised by the absence of any hæmozoin and of a containing erythrocyte.

Thick-drop examination naturally holds out better prospects of finding scanty malaria parasites in the marrow fluid, but there are a number of limitations to this method; the parasites are often distorted and when they are scanty, it may be hard to locate an unequivocal form, while—especially in preparations stained by Field's method—the trophozoites and gametocytes of *P. vivax* can often be recognised only with difficulty, being easily overlooked as cellular detritus amid the mass of marrow cells. In thick-drop preparations artefacts present greater difficulties; the basophilic erythrocytes appear as slightly reticular masses stained a dull blue by Field's or Giemsa's method, and if a platelet or other red-stained body is superimposed upon one it may easily be mistaken for a malarial trophozoite.

DISCUSSION

It is possible that a somewhat distorted picture of the importance of the type of case under review results from the fact that the patients were drawn from a body of young men, physically exceptionally fit and mostly on suppressive quinine, in whom considerable resistance to the free multiplication of the malaria parasite might be expected, even under the debilitating influence of some concurrent disease. In these circumstances, however, there may be a delay of up to several days before specific treatment is begun, if diagnosis has to be based on clinical observation. It may even be justifiable to proceed directly to sternal puncture in every case after a limited number of negative blood-slides. Over a period of time this would save much bed space in hospital, shorten the time lost by highly trained personnel and increase the comfort of patients by ensuring earlier treatment.

The second group illustrates the variety of the possible clinical manifestations of malaria and the importance of excluding malarial infection by all possible means in every case of pyrexial illness in the tropics in which the slightest suspicion exists. In a series of 250 cases of malaria, 46 gave a history of a short pyrexial illness with negative blood films within 3 weeks of admission. The illnesses had been labelled variously nasopharyngitis, tonsillitis, coryza, sandfly fever, dengue fever, gastritis, enteritis, heat exhaustion, and PUO. Of 250 unselected hospital patients questioned, only 18 have a similar history. In the absence of opportunity to test the question by a controlled series, it is interesting to speculate on the proportion of such cases in which malarial parasites would have been demonstrated by sternal puncture.

CONCLUSIONS

Sternal puncture is simple and easily performed. In malaria the parasites and their metabolic-disintegration products are more numerous in the sternal bone-marrow than in the peripheral blood.

Examination of sternal marrow fluid is of value in the diagnosis of malaria and should be carried out in cases in which repeated examination of the peripheral blood is negative. It elucidates the diagnosis in a number of cases of obscure illness.

The interpretation of stained preparations of sternal marrow fluid, especially thick drops, is not a responsibility to be undertaken lightly by the inexperienced.

STERNAL PUNCTURE IN THE DIAGNOSIS OF MALARIA

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EXAMINATION of peripheral blood is the keystone of malarial diagnosis, and where there is free sporulation in the peripheral blood there is no better method. There are some cases, however, in which the peripheral-blood parasites are so scanty as to be absent for practical purposes, and in which serial blood films are a source of hope rather than certainty. In an unselected series of 294 cases of malaria treated at this hospital, 256 were diagnosed from peripheral-blood examination, the remaining 38 revealed the parasite only by sternal puncture. Of the latter cases, many were so atypical as to have obtained such provisional diagnoses as neurasthenia, affective disorder, sandfly fever.

Serial blood-drops taken from them and stained by Field's method proved consistently negative, yet a positive diagnosis of malaria was readily made by the demonstration of parasites in the sternal marrow fluid. This accessory method in diagnosis of malaria has enabled a heterogeneous group of apparently unrelated illnesses to receive appropriate diagnosis and treatment. While this group forms only a small part of the total malarial casualties, it is one which is associated with much hospitalisation until the underlying malarial pathology is appreciated. These considerations have prompted us to indicate the value of sternal puncture in the diagnosis of such cases.

These cases comprise two main groups: Group A, latent or chronic malaria; and Group B, acute primary malaria.

GROUP A, LATENT MALARIA

This group has been a recurring problem in the Middle East, which though relatively healthy itself, has a shifting service population from hyperendemic areas in tropical Africa. They provide a source of subtertian malaria normally alien to the Middle East, where the indigenous illness is benign tertian malaria. Both varieties, however, provide instances of latent illness which are problems for diagnosis. Such cases are notoriously protean in character, but most of them fall naturally into three types which are conveniently described by case histories.

Type 1.—Obscure illness. The course of the illness may be long, the symptoms mild and vague. Such symptoms are a debility of insidious onset, accompanied perhaps by occasional headache, loss of weight, and in some instances by syncopal attacks. The patient may run an irregular low-grade pyrexia of 99° F in the evenings, but this is not a constant finding. There may be no history of previous malaria or sandfly type pyrexia. There is nothing on clinical examination, or in the blood findings, to suggest the malarial infection which is revealed by sternal puncture.

CASE 1.—Nursing orderly, aged 24. Benign tertian malaria (BTM) in August, 1940; routine cure. November, 1940, and July, 1941, treated for acute gastritis, but from the description of these attacks they may have been recurrences of malaria. He was symptom-free until March, 1942, when he noticed that he was feeling off-colour but had no definite symptoms. This general debility persisted through the summer until October, 1942, when he started to get headaches and occasional transient temperatures of 99° F in the evenings. On Oct. 29, after walking downstairs, he had a syncopal

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attack, fell and hurt his hip and elbow. This attack was not witnessed, and though he does not know how long the coma lasted, probably it was only a few seconds. On examination, temperature 99° F, no abnormal physical signs discovered in any system. Blood-pressure 140/88 mm. Hg. No abnormalities in complete blood-count, nor were any parasites seen. Sternal puncture demonstrated BT-rings. He recovered his previous good health after completing a full course of treatment.

CASE 2.—Pilot, aged 22. No previous history of malaria. Not previously stationed in a highly malarious district. Admitted on July 30, 1942. Treated for acute rheumatic polyarthritis which responded well to salicylates, but at a later date he developed mortic reflux. On Aug. 28 he developed a low-grade pyrexia, with associated mild polyarthritis, which was salicylate-resistant. Nine consecutive blood drops were negative for malarial parasites. Sternal puncture demonstrated the presence of BTM trophozoites and gametocytes in the marrow. The condition responded immediately to quinine.

Type 2.—Cases in which symptoms are predominantly psychological, presenting as neurasthenia or affective disorder.

CASE 3.—Pilot, aged 22. He had a good service record and had been awarded the DFC. Stationed for a week in April, 1942, at a coast town in a highly malarious district. About two weeks later gradual onset of anorexia, headaches and occasional vomiting. These symptoms progressed, and he was therefore admitted to hospital for investigation on July 15. He had lost 15 lb. in weight over the period. Physical examination disclosed no abnormality except for the loss of weight. Spleen not palpable. Mentally he was apathetic, uninterested in his work and suffering from insomnia. His whole picture simulated an anorexia nervosa. Investigations (including barium meal, fractional test meal, and stool examination) negative. His blood sedimentation rate, however, was raised to 45 mm. in an hour (Westergren) and he was running an occasional evening temperature around 99° F; 18 serial blood slides were negative. Sternal puncture showed infection with *Plasmodium falciparum*. Routine treatment was followed by complete recovery from both physical and mental symptoms. After he had been discharged from hospital he felt so well that he volunteered for particularly hazardous duties.

CASE 4.—Pilot, aged 38, with a good service record and, as far as could be ascertained, no clear predisposing neurotic trends. He complained of mental depression, lassitude and loss of interest in his work, for which he no longer felt confident. He had suffered from insomnia for several weeks, and the picture was that of a mild depressive state. He had been in and out of malarial country for many months and had regularly taken daily prophylactic quinine. The only positive clinical finding was an irregular evening temperature of 99° F. Serial blood films gave no positive information, but malignant tertian malaria rings were found in sternal puncture fluid. He responded rapidly to mepacrine and pamaquin therapy and returned to duty with zest and enthusiasm.

Type 3.—Self-limited short-term fevers without positive blood findings. These may have been diagnosed as sandfly fever, or as clinical relapsing fever if there is a history of previous attacks at short intervals. The medical histories of these cases often show several previous admissions, each of short duration, to various hospitals.

CASE 5.—Test pilot, aged 26. No history of malarial illness, but during the previous 3 months he had been in two different hospitals suffering from "sandfly" fever. He had felt quite well in the interval. He was admitted at the end of 3 days' pyrexia considered to be an attack of sandfly fever. Serial blood-films taken over 2 days showed no malarial parasites, and he claimed to feel quite well. Sternal puncture revealed ring-form parasites; the type was not determined, but was probably *P. falciparum*. The spleen was not clinically enlarged. The only positive sign was a subtertian type of temperature of 99° F.

CASE 6.—Pilot, aged 24. Stationed in a malarious area, but not taking any prophylactic quinine. One month before admission treated in a hospital for sandfly fever. Soon after discharge complained of diarrhœa, no associated blood or mucus in the stools and no tenesmus. Admitted to hospital for gastro-intestinal investigation. All routine tests negative. Spleen not palpable. Evening temperature of 99° F. Ten serial blood smears negative. Sternal puncture showed MTM rings. His intestinal disturbances subsided completely under malarial therapy.

CASE 7.—Pilot, aged 22. Had arrived, 4 days before admission, from an highly malarious district. Had been taking prophylactic quinine. Seven weeks before, while in that area, treated for "cough and bronchitis," 3 weeks before treated for bronchopneumonia with sulphonamides. Admitted complaining of recurrence of cough and malaise. X rays of chest showed pneumonic areas. Six serial blood slides were negative. Sternal puncture showed MTM rings. Rapid recovery after routine malarial treatment. The earlier attacks of bronchitis and bronchopneumonia were almost certainly malaria, suppressed by quinine, with respiratory complications.

GROUP B, ACUTE PRIMARY MALARIA

These cases had primary pyrexia compatible with malaria, but though they were commonly treated as such, they could not be proved positive by peripheral-blood examination.

CASE 8.—Clerk, aged 26, stationed in an area where primary malaria is uncommon. Had been perfectly fit. No prophylactic quinine taken and no antimalarial measures practised. Admitted to hospital after two days' headache, malaise and shivering. Temperature swinging to 105° F. Spleen not palpable. Seven serial blood-slides negative. Sternal puncture revealed BTM rings. Rapid response to routine treatment.

CASE 9.—Pilot, aged 25. Stationed in a malarious area for a month before admission. Admitted on account of frontal headache, malaise, and tertian type fever. Spleen palpable. Six serial blood slides and a blood concentration test failed to reveal malarial parasites. Sternal puncture demonstrated MTM rings. No suppressive quinine before admission. Responded to routine treatment.

CONCLUSIONS

Sternal puncture is accessory to examination of peripheral blood, and does not replace it.

It is of especial value in the diagnosis of latent malaria presenting as obscure illness, and may provide a positive diagnosis for some cases of "tropical neurasthenia." Most *pyrexial* malarial cases can be diagnosed by examination of the peripheral blood, but sternal puncture offers a supplementary way of diagnosing those cases where sporulation is so scanty that peripheral blood parasites seem to be absent.

GASTRODUODENAL HÆMORRHAGE TREATED MEDICALLY WITH ENTHUSIASTIC BLOOD-TRANSFUSION

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FIGURES for the mortality from gastroduodenal hæmorrhage published during the last 10 years vary enormously. In publications from many places (e.g., Finsterer 1939, Blackford and Williams 1940, Bohrer 1941, Walters and Cleveland 1941, and Gordon-Taylor, 1937–8), where the results of medical treatment have not been entirely satisfactory, surgery has been advocated. This form of treatment is, however, not generally desirable. As Professor Witts has said, "Every surgeon cannot be a Finsterer."

In the present series of cases, most of them severe, treated entirely medically—with complete rest, morphine when necessary, a modified Witts's diet, a kaolin mixture and vitamin C—the results were satisfactory. This has been in large measure due to the additional massive and enthusiastic transfusion treatment adopted in the severe cases. This form of treatment has only recently become possible in virtue of the greatly increased supplies of blood for transfusion now available with the system of widespread blood-storage by the War Emergency Blood Transfusion Services. On account of these encouraging results obtained by this new form of treatment, this series of cases, although small, was thought worthy of report.

Accurate classification of hæmatemesis is impossible and hence most of the published statistics are not comparable. In this instance, we have followed Witts in grading all cases of multiple hæmorrhage as severe;

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single hæmorrhages were also regarded as severe if signs of secondary shock were produced and particularly if the shock had been allowed to persist.

Where frank signs of established shock (usually manifested by pallor, sweating, coldness, cyanosis and disturbance of pulse-pressure or fall in systolic pressure) were present, the cases were given whole blood at a moderately rapid rate—e.g., 500 c.cm. per half hour, until there was clinical improvement, paralleled by a rise in systolic blood-pressure to 100 mm. Hg or a restoration of a more normal pulse-pressure. The transfusion was then slowed to a drip-rate of 40 to 60 drops a minute. Cases not showing the clinical phenomena of shock but with a hæmoglobin below 60% (Haldane) were transfused at a drip-rate throughout either with whole-blood or concentrated red-cell suspension (MacQuaide and Mollison 1940). For all cases, blood stored in the standard sodium-citrate glucose anticoagulant (MRC War Memorandum 1940) for 2 to 14 days was used.

CASES TREATED

In the last 12 months 30 cases (16 men and 14 women) of hæmorrhage were admitted to a general hospital. Some were too mild to need transfusion, but all cases of hæmatemesis or melæna, or both, were treated by the above routine. They have been classified in the table.

Age	Hæmorrhage	
	Mild or moderate cases	Severe cases
30–40	3	8
40–50	3	3
50–60	1	3
60–73	4	5
Total	11	19
Transfused ..	2	19

The cases fell into 4 clinical groups:

1. Single hæmorrhage without shock, 11 cases.
2. Single hæmorrhage with shock, 2 cases.

CASE 1.—Woman aged 37, with a 4 years' history of vague dyspepsia, had a large hæmatemesis in the hospital. After an hour's conservative restorative treatment, she was still pale, cold and clammy; blood-pressure 100/50 mm. Hg, Hb 84%. She was given 500 c.cm. of blood in ¾ of an hour and a further 500 c.cm. in the next 2 hours. There was a satisfactory rise of blood-pressure. An uninterrupted recovery followed. Final (gastroscopic) diagnosis: multiple gastric erosions.

3. Multiple hæmorrhages in a young person (age less than 45). There were 8 cases, of which the following is typical.

CASE 2.—A man aged 35, with a 5 years' history of peptic ulcer vomited a pint of blood at home; Hb on admission 95%; BP 125/90 mm. Hg; 36 hours later he vomited 3 pints of blood. BP 90/70 mm. Hg. He was given 500 c.cm. of blood in half an hour. The BP rose to 105/60 mm. Hg; a further 1000 c.cm. of blood was given at a drip rate. The next day he received 500 c.cm. of a concentrated red-cell suspension. On the next day he had another hæmatemesis and another transfusion. On each of the next four days he had several hæmatemeses of ½–2½ pints, and each day was transfused accordingly. His Hb was 50–65% during this time and the BP satisfactory. For the next 4 days he was not transfused and had no hæmatemeses but persistent melæna. The Hb fell to 35%. He was therefore given 1000 c.cm. of concentrated red-cell suspension. Four days later, his Hb had again fallen from 65% to 50%. A further transfusion of concentrated red-cell suspension (1000 c.cm.) raised his Hb to 80%, after which he made an uninterrupted recovery. Within 15 days he had received 9000 c.cm. of whole blood and 4000 c.cm. of concentrated red-cell suspension. Final (radiological) diagnosis: chronic duodenal ulcer.

4. Multiple hæmorrhages in an elderly person (with or without hyperpiesia); 8 cases.

CASE 3.—A woman aged 73, with a many years' history of peptic ulcer, had a hæmatemesis of 2 pints at home. On admission her BP was 140/90 mm. Hg, Hb 55%. She was given 500 c.cm. of whole-blood slowly, but continued to vomit small amounts of blood. The next day she received a further 1000 c.cm. of blood. The following day her Hb was 70% and her BP 190/100 mm. Hg. She made an uninterrupted recovery; the hypertension persisted. With a barium meal no ulcer was seen, but there was extensive calcification of the splenic artery.

The only death in this series occurred in this group.

CASE 4.—A woman aged 71 with no previous history of dyspepsia. On the day before admission she vomited 2 pints of mixed blood and food. Her condition was satisfactory for 48 hours after admission. She then had a small hæmatemesis and another the following day, BP 90/45 mm. Hg, Hb 57%. She was given 1000 c.cm. of blood, but the Hb at the end of transfusion was only 60%. The following day she was therefore given 500 c.cm. of concentrated red-cell suspension. The day after that she had another hæmatemesis and another transfusion, after which her condition was good for 48 hours. Another series of hæmatemeses followed with severe signs of shock; 2500 c.cm. of blood were given in 20 hours; all signs of shock disappeared and the Hb was 65%; 24 hours later, however, the hæmorrhages were repeated with profound collapse. With heroic transfusing her BP was raised gradually from an unreadable figure to 110/60 mm. Hg, and Hb to 80%, 4000 c.cm. of blood being given in 19 hours. She died suddenly and unexpectedly 10 hours later. At autopsy one doubtful erosion only was found high up on the posterior wall of the stomach. It overlay a pale nodule about 3 mm. in diameter. Histologically this proved to be an erosion of the mucosa over an abnormally large submucous artery which had perforated, the nodule being a fibrin clot. The artery was otherwise histologically normal. The most notable post-mortem lesion was a severe confluent central necrosis of the liver, presumably due to anoxæmia resulting from the unduly long state of collapse the day before death. The lungs were dry.

DISCUSSION

"Blood transfusion correctly applied is the most important single factor in saving life in severe gastro-intestinal hæmorrhage," was the opinion expressed by Bennett and his colleagues (1942).

Ideally this treatment should be controlled by repeated blood-volume estimations. In practice skilled personnel is required for the determinations, and reliable methods—except perhaps that of Crooke and Morris (1942)—are not sufficiently rapid. Moreover, if bleeding begins again after the dye has been injected, more dye must be given to form a new base line. With Evans's blue only a maximum of 150 mg. in divided doses is permissible. This maximum may well be reached in 48 hours. Also, the best methods, assuming they are accurate, measure only the volume of circulating plasma. It is possible that variations in the volume of non-circulating plasma may be of importance in cases of shock secondary to hæmorrhage.

In the absence of blood-volume estimations the indications for transfusion usually cited (e.g. by Witts 1937) are a systolic blood-pressure of less than 90 mm. Hg, a pulse-rate greater than 140, a blood-urea greater than 100 mg. per 100 c.cm. and a hæmoglobin of less than 40%. Human subjects however vary so greatly in their responses to all forms of injury or disease that in clinical medicine it is impossible to lay down hard and fast rules. Grant and Reeve (1942) studying air-raid casualties in which "hæmorrhage plays an important part but is not the sole factor involved" could find no constant sign which could be taken as a measure of severity. Figures are, therefore, notoriously fallible and if quoted must allow the widest possible margin for safety. In the case of hæmorrhage, a patient can be profoundly shocked and yet his systolic pressure may be well over 90 mm. Hg, even above 150 mm. Hg, depending in some measure upon the systolic pressure prior to the hæmorrhage a, figure which often is not known. An equally important figure is the pulse-pressure. The pulse-rate by itself is not so important as an indication for transfusion. Many of our severe cases, even at their worst, never had a pulse-rate above 140; the degree of tachycardia was often not proportional to the severity. The figure for the blood-urea given by Witts is also, in our opinion, high.

We prefer, therefore, not to diagnose shock in terms of figures for blood-pressure, &c. The diagnosis in the present state of knowledge is a clinical one; it may well

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vary with the individual observer. It is our experience that shock in gastro-intestinal hæmorrhage, if it does not quickly respond to more conservative measures, does so with adequate transfusion therapy unless it has been too long established.

Cases with clinical signs of shock were transfused rapidly to avoid the irreversible changes seen in tissues subjected to prolongation of this state (Dunphy et al. 1941). This procedure raises the blood-volume towards normal and thus increases the renal blood-flow and tends to reduce azotæmia (Black 1942). It has been claimed that this practice by increasing the blood-volume and pressure dislodges the thrombus in the bleeding vessel and restarts the hæmorrhage. There has never been any evidence supporting this. It has also been claimed that vascular constriction of the arteriosclerotic arteries of the elderly, and of the arteries in the bases of penetrating ulcers is deficient. In the present series hæmostasis was, with one exception, well maintained in the elderly, and in this case the artery was histologically normal. Although it appears established in the United States (Blackford and Cole 1939; Blackford and Williams 1940; Walters and Cleveland 1941) that the mortality is greatest over the age of 45, most of the really disturbing hæmorrhages in this series occurred in the age-group under 45. Several of the cases were found by gastroscopy, 3–4 weeks after the cessation of the hæmorrhage, to have large penetrating ulcers.

Bennett and his colleagues (1942) quote figures to show that the drip-rate of transfusion at least does not tend to restart hæmorrhage. They also note that the exclusion of pyrogens from transfusion fluids has eliminated dangerous pyrexial reactions. In this series there were no pyrexial reactions of such severity as to cause anxiety. The criticisms of Hurst and Ryle (1937) are thus answered.

When the subject is not in a clinical state of shock but is anæmic as a result of the hæmorrhage, transfusion is again indicated, not only for the correction of the existing anæmia but also as an insurance against a further hæmorrhage, which may be of such severity as would be well withstood by one with a relatively normal blood-content but not by a debilitated anæmic person.

The most generally available guides to the severity of the anæmia are hæmoglobin determinations, but these are so fallible that with their use again a wide margin of safety must be allowed. We recommend the transfusion of all cases with a Hb below 60%. On occasion, this figure may be obtained with a red-cell volume of 700 c.cm., the lowest safety limit set by Bennett and his colleagues. Here again it is our experience that transfusion does nothing but good. The circulating hæmoglobin is restored to a more or less normal level and the dangers of anæmic anoxia of vital tissues, such as the brain and myocardium, are avoided.

With repeated bleeding, the transfusion should be repeated as often as the bleeding, or as often as will keep the Hb greater than 60% (e.g. case 2; or another man who received each day for 9 days 500–1500 c.cm. of whole blood or concentrated red-cell suspension, a total of 4 litres of blood and 5 litres of red-cell suspension).

For the cases transfused the average number of donors required for blood or red-cell suspension was 9 (range 2–34). In these cases of persistent bleeding the hæmoglobin level can be maintained for long periods by these massive transfusions. We are indebted to Wigglesworth and Cohen, for information about a case of melæna (later shown to be due to a secondary neoplasm of the gut)—a young soldier who received in 7 weeks the blood or red-cell suspension from 193 donors.

For the slow persistent bleeders it seems safe to give up to 1½–2 litres per day at a drip rate. When the blood-volume is depleted by intercurrent hæmorrhages larger amounts may be required (e.g. case 4).

The treatment of mild hæmorrhage, especially in young patients, appears to be universally accepted as medical; that of severe hæmorrhage is arguable. We believe medical treatment to be the one of choice because of: the common difficulty of diagnosing the presence and site of a peptic ulcer; the difficulty of differentiating in the first 48 hours (as recommended by Finsterer 1939) the hæmorrhage which is to be the forerunner of multiple severe hæmorrhages from the mild single hæmorrhage; the paucity of surgeons practised in operating on such cases. Again, except in a few instances, the statistics of medical treatment are at least as good as those of surgical treatment, and improvement in transfusion tactics and supplies have added greatly to the physician's armamentarium. Surgery appears to be indicated only in special clinics or where there are additional indications such as obstruction or perforation.

SUMMARY

A small series of 30 cases, 19 of them severe, of gastro-duodenal hæmorrhage have been treated entirely medically.

The severe cases were transfused much more enthusiastically than is usual, and clinical results were highly satisfactory. There was only one death.

Indications are given for transfusion.

We should like to thank Dr. E. B. Brooke and the nursing staff of St. Helier Hospital, for their great help and coöperation.

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INTRACISTERNAL INJECTION OF POTASSIUM PHOSPHATE

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AT the Academy of Sciences in Moscow, Stern (1942 a, b) has advocated the use of potassium phosphate in patients suffering from shock after trauma or hæmorrhage. Animals in a state of shock following serious wounds, with or without hæmorrhage, are said to have recovered dramatically after the injection of a small quantity of potassium phosphate (equivalent to 3–4 mg. potassium) into the cisterna magna. Blood-pressure rose to normal in 30 seconds and respiration and reactivity became normal. Furthermore, shock following hæmorrhage could be combated by potassium injection without transfusion. Few details are given (e.g., there is no record of the anæsthetic used or the criteria of shock), but on the basis of these experiments a technique for stimulating "exhausted sympathetic centres" by potassium phosphate injected intracisternally into man is described. The Russian workers claim that this procedure has proved its value in the field, although the usual methods of treatment are employed at the same time.

It is generally recognised that potassium salts in small quantities excite and in larger doses depress nervous tissue, but there have been few records of the general effects of applying the ion to medullary centres. Stern and Chvoles (1933) found that intracisternal injection of potassium chloride caused a rise of carotid blood-pressure, confirmed by de Vleeschouwer (1935). Hermann and others (1938) showed that injection of this salt intracisternally in chloralosed dogs caused both a rise of carotid blood-pressure and secretion by the adrenal medulla. The pressor response persisted after bilateral adrenalectomy with bilateral vagotomy. In 1941 Stern reported that injection of potassium salts into the cerebral ventricles of various animals caused a well-marked rise of blood-pressure, augmented respiration and increased muscle tone. Ainslie and Dax (1942) followed blood-pressure changes, presumably in the arm, of 3 psychotic patients, not shocked or bled. Of 11 injections carried out according to Stern's directions,

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only one was followed by significant rise of pressure. In 6 cases there was a transient fall, accompanied by slowing of the heart by as much as 45% of the initial rate. The sequelæ included nystagmus and sweating; respiratory activity was said to change very little even when other signs were pronounced.

In the experimental work no reference is made to the height or duration of the pressor effect. There is also some inconsistency in the effects on blood-pressure and respiratory activity. The following work aimed at investigating in more detail, first, the effects of intracisternal injection of potassium phosphate on the cardiovascular and respiratory systems; secondly, whether hæmorrhage altered the responses; thirdly, whether injection of a large dose would permanently damage the brain stem.

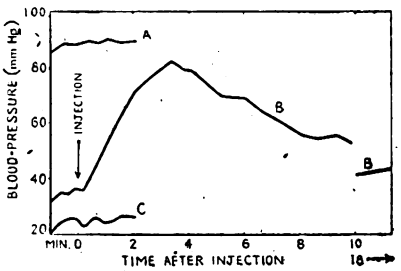

Fig. 1—Rise of mean carotid blood-pressure after intracisternal injection of 0·05 ml. potassium phosphate solution. Pressure had been previously lowered by rapid bleeding from femoral artery.
A. Initial BP.
B. Response to potassium phosphate after bleeding.
C. Response to control injection of 0·05 ml. normal saline intracisternally after bleeding.

METHOD

Adult rabbits were anæsthetised by injection of urethane or pentobarbital solution into an ear vein. Carotid blood-pressure was recorded by mercury manometer or optically. The latter method allows of accurate counting of heart-rate. Respiration was recorded by a balloon strapped to the epigastrium and connected to a tambour and writing lever. For optical records it was simpler to connect a sensitive tambour carrying a mirror to a side arm of the tracheal cannula. Injections into the cisterna magna were made with a hypodermic needle pushed through the atlanto-occipital membrane. In later experiments we punctured the membrane with a wide-bore needle and left it in position during the experiment; solutions were injected along a fine needle passed into the larger one. This procedure entailed reduction of the cerebrospinal fluid pressure to atmospheric, puncture of the membrane being signalled by the escape of about 0·5 ml. of clear colourless fluid. Autopsy confirmed the entry of the needles into the cisterna magna and the absence of damage to the medulla. The animals were bled from a cannula in the femoral artery or from the carotid cannula itself.

The following solutions of potassium phosphate were used: (*a*) ⅛ molar potassium dihydrogen phosphate diluted with ⅛ molar potassium hydroxide to pH 7·6 (colorimetric); (*b*) ⅛ molar phosphoric acid diluted with potassium hydroxide to pH 7·6, provided sterile in 1 ml. ampoules.

RESULTS OF INJECTION WITHOUT BLEEDING

Intracisternal injection of potassium phosphate caused alteration of blood-pressure, respiratory activity and tone of skeletal muscle.

Blood-pressure changes.—Carotid blood-pressure increased after a latent period of ½–1 minute. This change was usually slow, and followed by a slower fall to the initial level (cf. fig. 1). The average duration of the pressor effect was about 15 min.; only rarely was the effect prolonged up to 45–60 min. Rise of blood-pressure is not a constant result of the injections. Of 57 injections which caused alterations of respiratory and skeletal muscle activity, 35 caused a rise of blood-pressure; in 20 the rise was 20–40 mm. Hg, and in one animal 78 mm. Hg. The rise was often preceded by a transient sharp fall, which began about 5 sec. after injection and lasted 1–2 min. Some animals showed only the depressor effect, without subsequent pressor effect. We could observe no cause for this variation in response to the injection, but it is possible that the anæsthetic was a contributing factor. The initial fall of pressure was accompanied by slowing of the heart. Section of both vagus nerves in the neck did not modify the fall of pressure (fig. 2). Alterations of reactivity of the animals may have masked any quantitative change due to the nerve section, but our results do not suggest this. The form of the pressure tracing and the slowing of the pulse were similar before and after vagotomy.

Respiration.—After a brief latent period respiration became quicker and deeper. These changes were noticeable before any alteration of blood-pressure occurred, and served as a useful index that the injection had been effective; indeed the first respiration after the injection was altered. After rapidly increasing to a maximum in ½–2 min., breathing gradually returned to normal; as a rule the respiratory change lasted as long as the blood-pressure change, although there might be no pressure change in spite of respiratory alteration. Hyperpnœa accompanied both fall and rise of blood-pressure. With larger doses respiration might be inhibited for a few cycles, but always increased subsequently. In one animal, under deep pentobarbital anæsthesia, the injection was followed by so long an inhibition that artificial respiration was necessary.

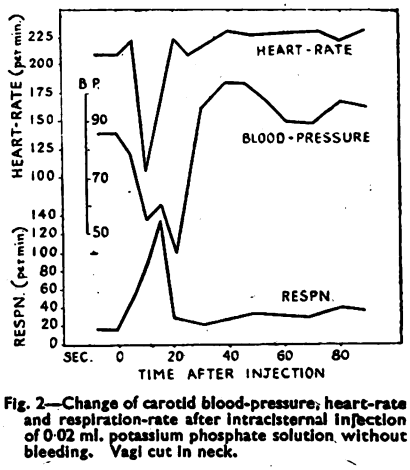

Fig. 2—Change of carotid blood-pressure, heart-rate and respiration-rate after intracisternal injection of 0·02 ml. potassium phosphate solution without bleeding. Vagi cut in neck.

Skeletal muscle.—Tone of voluntary muscle increased. The smallest effective injection caused increased tone and slight tremor of shoulder muscles. With increased dosage the signs were more widespread, notably head-retraction, strong extension of the limbs, deviation of the eyes and constriction of the pupils. Convulsions might supervene quickly, being preceded by strong flexion-extension movements of the limbs. The convulsions lasted only a minute or two but the muscle tone decreased very slowly. The latent period of these tonus changes is very short, tremors of muscles preceding any blood-pressure change.

Control.—The alterations of body activity are not due to intracranial pressure changes. Control injections of normal saline produced no significant alteration of blood-pressure or any other visible effect.

Section of spinal cord with bilateral vagotomy decreased the responses considerably, but did not entirely abolish them. When the cord was cut across between the first and second cervical roots and both vagus nerves were cut in the neck a slight fall of blood-pressure was followed by a slight rise which persisted. The alterations were not greater than 5 mm. Hg either way, but had the same time relations as those previously described. The persistence of the effects suggests that some alteration of the state of the vessels of the head was still possible. The intracisternal injection caused tremor and increased tone of facial and upper neck muscles, but no alteration in the tone of the muscles of the rest of the body. Intravenous injection of the salt in doses ten times greater than the intracisternal dose caused no change of carotid blood-pressure; this suggests that the effect is due to direct action on the medullary centres, and not to an increase in circulating blood potassium.

RESULTS OF INJECTION AFTER BLEEDING

Central blood-pressure was lowered by rapid arterial bleeding. Loss of 30–40% of the blood volume (assuming blood volume of rabbit is 7% of body-weight) reduced the pressure to 30–50 mm. Hg; the subsequent recovery was usually slow enough to give a base line. If recovery was too rapid, a second bleeding up to 10% of the volume lowered the pressure again and was followed by a slow recovery.

The effects of intracisternal injection of potassium phosphate before and after bleeding were qualitatively the same. The sensitivity of the animals varied during the experiments and quantitative comparisons were not possible. The same dose of phosphate often caused a different blood-pressure response when repeated without

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bleeding. Our results did not indicate any regular alteration of the blood-pressure response after the bleeding; a rise of pressure was not maintained, the pressure falling again to the initial low level (fig. 2).

DOSAGE OF POTASSIUM PHOSPHATE

The range of volume of phosphate solution injected in these experiments was 0·01–0·05 ml. The smaller amount was not always effective, while the larger dose often caused convulsions. In most cases 0·02 ml. caused blood-pressure and respiratory alterations without excessive limb movements. This volume of solution contained only 0·24 mg. of potassium.

ABSENCE OF PERMANENT TOXIC EFFECT

Rabbits were anæsthetised with ether, and sterile potassium phosphate solution was injected into the cisterna magna. The animals were then allowed to recover from the anæsthetic.

Injections of 0·05–0·075 ml. caused a temporary stimulation of respiration and some increase of tone of the limbs. The animals recovered normally from the anæsthesia and did not show any subsequent ill effects. A very large dose, 0·20 ml., caused a well-marked increase of respiratory rate and muscle tone; flexion-extension movements of the limbs began, but ceased on deepening the anæsthesia. On recovery from the anæsthetic the respiratory effect persisted for some time, and the animal showed a spastic paresis of the hind limbs; this latter condition cleared up rapidly, the animal behaving normally within an hour of the injection.

DISCUSSION

The reactions evoked by increasing the potassium content of the cerebrospinal fluid are due to excitation of nervous centres above spinal-cord level. Rapid injection of such a small dose of the phosphate into a vein has no visible effect, and the responses to the intracisternal injection are almost abolished by high section of the spinal cord with the vagi cut. Furthermore, Mullin, Hastings and Lees (1938) have shown that replacing the cerebrospinal fluid of dogs by fluid of high potassium or low calcium content increases muscle tone and may produce rise of blood-pressure, but irrigating the spinal cord or spinal roots with the fluid was ineffective. It is well known that injection of potassium salts into the circulation may alter the blood-pressure level and cause secretion by the adrenal medulla. The requisite dose, however, is larger than any used here. Intravenous injection of a dose ten times greater than the effective intracisternal dose was without effect.

The transient slowing of the heart and fall of blood-pressure following some of the injections would be most simply explained by direct stimulation of vagal centres by the salt. That this is not the true explanation is shown by the persistence of the responses after section of the vagus nerves, and it seems rather that there is a temporary depression of sympathetic centres. The increased tone of the muscles probably accentuates any rise of blood-pressure by a mechanical effect on the vessel, but it is clear that the pressure and tone changes are of independent origin. Small doses of phosphate always produced increase of muscle tone, but the blood-pressure might rise, fall or remain unchanged. Furthermore, Mullin, Hastings and Lees still obtained a rise of pressure after exhibition of curare in doses sufficient to paralyse voluntary muscles.

It is remarkable that the injection of equal doses of the salt may produce very different responses, even in the same animal, with no apparent change of general condition. The number of failures to produce a rise of pressure may be related to the use of anæsthetics; Mullin, Hastings and Lees found that the responses were greater in unanæsthetised than in anæsthetised dogs. On the other hand, Ainslie and Dax (1942) had many failures in unanæsthetised men, and Stern herself indicates that the injections are not always effective. When a rise of blood-pressure occurs it does not last long. The duration may be curtailed under the experimental conditions, but it is noteworthy that Ainslie and Dax observed pressure changes in man more transient than those described above.

The short duration and erratic appearance of rise of blood-pressure after the intracisternal injection of potassium phosphate do not suggest that these injections would be of value in conditions of low blood-pressure following acute hæmorrhage. It is possible that a rise of central blood-pressure, however short-lived, might increase the blood flow through the vital centres at a critical time, but no such beneficial result was found by us. When the blood-pressure was low, potassium phosphate injections caused a temporary rise in some cases, but this was followed by a fall of pressure again to the low level. If however these injections should be tried as a form of therapy on shocked patients, the animal experiments show that there is not much danger of damage to the brain stem even from large doses.

SUMMARY

Potassium phosphate solution, prepared according to the directions of Stern, when injected into the cisterna magna of anæsthetised rabbits, caused a rise of blood-pressure, augmented respiration and increased muscle tone. The pressure change lasts only some 15 minutes and rarely exceeds 40 minutes. There is often a fall of pressure, with slowing of the pulse; both of these changes are independent of the vagus nerves. The responses are not altered by previous hæmorrhage. The pressure change is not wholly due to the alterations of muscle tone, but is due to some action of the salt at supraspinal levels. No permanent toxic effects follow the injection.

Note.—After this paper was written E. A. Smolik described the injection of 0·4–0·5 ml. of Stern's phosphate solution intracisternally in dogs anæsthetised with barbital (*Proc. Soc. exp. Biol. Med., N.Y.* 1943, **53**, 70). Dogs with normal blood-pressure showed increased respiration, after initial inhibition, and rise of arterial pressure. After prolonged hypotension following bleeding, Smolik found that the responses were not uniform but he does not describe the variations encountered; in this series of animals 3 died of respiratory failure after the injection. Four times the usual dose of phosphate caused rise of blood-pressure and stimulated respiration, but 6–10 min. later blood-pressure fell abruptly and the animals died.

We are grateful to Prof. B. A. McSwiney for his advice and assistance in performing the recovery experiments; and to Crookes Laboratories Ltd. for a supply of sterile potassium phosphate solution.

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"STRESS" FRACTURE OF FEMORAL NECK

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A NUMBER of cases have lately been reported of fractures in young adults with no history of any specific trauma to account for them. These commonly occur in men undergoing military training, usually within the first 6 months of their service. They complain of pain in the region of the affected bone, inability to stand up to their training, and in some cases a painful swelling at the fracture site. Their practical importance lies in two points—that the radiological appearances may simulate those of Ewing's sarcoma, and that if not detected in time the fracture becomes complete and the treatment is then prolonged by many weeks. The following is a typical case.

An aircraftman, aged 21, came to surgical outpatients on March 15 complaining of pain in his right hip for 7 weeks. It began some 4 hours after he had been on a five-mile cross-country run. Though he had been on such runs before he had not worn heavy boots or been paced as on this occasion. He was not conscious of any sudden strain or injury during the run, but felt very exhausted afterwards. He had felt pain in the hip intermittently ever since, and was excused PT and running on this account. The pain began in the thigh muscles over the upper and outer aspect. Later he felt it over the great trochanter. There was also some stiffness in the knee. The pain had been bad enough to keep

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him awake some nights, but was improving at the time he was seen, though he had never been kept off his feet.

He was a slightly built but healthy looking man. There was no muscle wasting in the right thigh, and no difference in power on the two sides. Compared with the left, internal and external rotation of the right hip were limited by about 5°, abduction by 15° and extension by 10°. Pain was complained of over the great trochanter on reaching the extremes of flexion, rotation or abduction, and on hyperextension. There was no flexion deformity at the hip. There was very slight tenderness on compression of the two great trochanters.

X rays (see figure) revealed a fine fracture line across the neck of the femur, with some callus thrown out at the upper end, and some sclerosis in the centre. There was no displacement. He was treated simply by rest in bed with a transverse bar of wood nailed across the heel of his slipper to prevent outward rotational strain. This was maintained for 8 weeks; union proceeded uneventfully and in perfect position.

The arrow shows the site of the fracture.

DISCUSSION

Similar cases of fractures in the neck of the femur without trauma or displacement have been reported by Samuel (1942) and Mansi (1943), and mentioned by Nordentoft (1940). In Mansi's case the patient was never confined to bed, but the fracture united without displacement. Fractures in the tibia, shaft of femur, fibula and other bones have been recorded, notably by Hartley (1942), who mentioned 14 cases. Changes in the structure of bone preceding fatigue fractures are described by Henschen (1941) as of two kinds—first, affecting the crystalline structure, and secondly, the physiological formation, whereby lamellar bone is replaced by more fibrous bone with a low calcium content; there are fibrous changes in the marrow, and may be subperiosteal thickening.

No abnormality of calcium metabolism has been described, and in the present case the blood-calcium level was 12·1 mg. per 100 c.cm. Though vitamin C is now known to be important in the formation and repair of bone no note of its level in such cases could be traced. In the case recorded it was only 0·27 mg. per 100 c.cm., which is below the minimum value (0·5 mg.) desirable in the blood, but above the figure (0·15 mg.) below which clinical scurvy occurs (Goodman and Gilman 1941). In view of the work of Ham and Elliot (1938) pointing out the deficiencies in strength and weight of bone in animals on a diet containing suboptimal amounts of vitamin C, this may be significant in the ætiology of these cases, though vitamin-C deficiency is common and these fractures rare.

I should like to thank Mr. J. Bastow, orthopædic consultant to the EMS for allowing me to retain the case; Dr. Phyllis Fraser for making prints from the radiograms; Lieut.-Colonel Hazard of the US Army for the ascorbic acid estimation; and Dr. J. H. Gubbin, medical superintendent, for permission to publish the case.

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NATIONAL SMOKE ABATEMENT SOCIETY.—The annual conference of the society will be held at 10 AM. on Friday, Nov. 5, at the Caxton Hall, Westminster, S.W.1, when measures for the prevention of smoke in relation to plans for postwar reconstruction will be discussed.

UNTOWARD EFFECTS OF VITAMIN B_1

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THE purpose of this paper is to draw attention to a clinical condition occasionally observed after administration—mainly parenteral—of large doses of thiamine hydrochloride. Little has been reported about toxic effects of excessive administration of vitamin B_1; I have only been able to find the instances referred to below.

The considerable therapeutic effect of the vitamin B group appears to be due to their catalytic activity in intracellular oxidation (Leitner 1942). They are essential constituents of co-enzyme systems affecting intracellular respiration. Thus in the intracellular metabolism of glucose the pyruvic acid is broken down to acetaldehyde by the co-carboxylase which is the pyrophosphate of vitamin B_1. Metabolism in the brain and in the specific nervous tissue depends almost entirely on the oxidation of glucose. In vitamin-B_1 deficiency pyruvic acid accumulates in excess in these tissues and cannot be broken down to carbon dioxide and water. Furthermore lack of vitamin B_1 is nearly always part of a multiple deficiency (Goodhart and Sinclair 1940).

CASE-HISTORIES

I have recently observed the following two cases.

CASE 1.—A man aged 71, seen on March 2, 1943, had been in good general health up to the beginning of February and able to carry on a fatiguing and responsible job. About 4 or 5 weeks before he had become restless, irritable and tired; he experienced what he described as "thumping" throughout the body which led to disturbed sleep and increased exhaustion. In the last few days this "thumping" had appeared increasingly during day time as well, while restlessness, exhaustion and insomnia became worse in spite of drugs. Itching began, mostly on the extensor surfaces of the limbs; he became more and more depressed and tired. For some days he had been in bed with "asthmatic" attacks, each lasting for 2–4 hours with sneezing, palpitation, difficulty of breathing and extreme anxiety at the end of which he was completely exhausted.

Previously he had always been healthy and had never had any serious illness except herpes zoster in 1938 along the first division of the trigeminal nerve. During and after this attack, in which he experienced considerable pain, he was given a long course of injections of vitamin B_1, and his symptoms gradually improved.

He was a tall well-nourished patient, much agitated, apprehensive and depressed. Apart from some subjective and objective interference with sensation in the distribution of the ophthalmic division of the fifth nerve, and some lichenification, thickening and reddening of the extensor surfaces of both upper limbs no physical signs were found. Blood-pressure 175/85 mm. Hg; urine normal. Blood sedimentation-rate: 3 mm. in 1 hour. Blood-count: red cells 4,400,000; Hb. 12·6 g. per 100 c.cm.; white cells 7900. Polymorphs 33·5%, lymphocytes 26·5%, basophils 0·5%; monocytes 5%; eosinophils 34·5% (i.e. 2725 per c.mm.). Subsequent differential counts are shown in the table.

The high eosinophilia led to further inquiries and it was found that on casual advice injections of 25 mg. of vitamin B_1 had been administered repeatedly in the last 3 or 4 weeks by a nurse in his office, and that the beginning of these injections coincided with the onset of his illness. The first "asthmatic" attack began 7 hours after the fourth injection although some shortness of breath had already followed previous injections. A very serious attack occurred about an hour after the fifth injection. Dr. D. C. Norris, who witnessed this attack, described it as follows: "The patient had a normal temperature and pulse-rate but felt weak and shaky and unable to maintain a conversation. His extremities were cold and he complained of 'thumping' in the chest. The blood-pressure was 120/70 mm. Hg."

Skin tests with vitamin B_1 produced a weal of about 2 cm. diameter. The vitamin-B_1 injections were stopped and autohæmotherapy carried out; there were no more attacks afterwards. Repetition of skin tests after 4 weeks did not produce a weal; 3 mg. tablets of vitamin B_1 thrice daily for 2 subsequent days; and afterwards injection of 5 mg. thiamine, did not produce anv adverse effect. The patient was now quite well.

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DIFFERENTIAL WHITE-CELL COUNTS IN CASE 1

	March 2	March 4	March 15	March 26	April 5
	%	%	%	%	%
Neutrophils	33·5	37	56	62	60
Lymphocytes	26·5	26	24	23	30
Monocytes	5	5	4	8	7
Basophils	0·5	0·5	0·5	..	..
Eosinophils	34·5	31	15·5	7	3
Eosinophils per c.cm.	2725	2480	1162	490	216

CASE 2.—A married woman aged 42 was seen in June, 1941, with polyneuritis. As a child she had all the common fevers and later on had suffered from constipation and mucomembranous colitis for years. All her illnesses were "very serious" and had unexpected "complications." For years she had experienced great difficulties in managing her life, and before the war she was having psychotherapy. Owing to her self-chosen diet and abuse of aperients she had a multiple vitamin-deficiency going back for years. She had been given, intermittently, large doses of vitamin B_1 by injection and other vitamins as well previously. A change of diet and injections of 25 mg. of vitamin B_1 were advised. When seen 2 weeks later she was very excited, had tremor, insomnia in spite of large doses of sedatives day and night and complained of headaches, palpitation and giddiness. Although not familiar with the condition of vitamin B_1 overdosage at that time, I thought it advisable to discontinue the injections, especially as the polyneuritis had improved. The tremor, giddiness and palpitation had disappeared when the patient was seen a week later.

DISCUSSION

These two cases and those published by other workers suggest that untoward effects of vitamin-B_1 therapy may be either purely allergic, or similar to a thyrotoxic state.

Ataxia after injection of vitamin B_1 in animals was first observed by Kreitmair and Moll (1935). Irritability, restlessness, transient dyspnœa, and with increased doses death, in animals, were described by Molitor et al. (1936) and Hecht et al. (1937); and interference with lactation and loss of nursing instinct with consequent starvation of the young by Perla (1937). Toxic effects in man after large intravenous doses of thiamine were first reported by Steinberg (1938). In 3 cases herpes zoster was produced after 4–8 weeks' treatment, which disappeared in each case after cessation of the injections, but returned when vitamin B_1 was given again. In two of these cases nausea, fullness in the epigastrium, constriction of the throat and severe cramps appeared a few minutes after intravenous injection of vitamin B_1. Mills (1941a) reported a woman of 47 who had 10 mg. of thiamine daily for 2½ weeks, when headache, irritability, insomnia, rapid pulse, palpitation and trembling appeared. The symptoms cleared 2 days after the drug was discontinued. After a week's rest 5 mg. of thiamine was given again daily and the same symptoms developed after 4½ weeks.

Allergic symptoms were experienced in the following cases. A woman of 72 who had never had allergic symptoms before (Laws 1941), had 26 injections of 25 mg. of vitamin B_1, first daily, later weekly, with no untoward symptoms for about 2 months except occasional sneezing and slight weal reactions. Suddenly—when the interval between injections was increased to 10 days—about 30 minutes after the injection violent sneezing, œdema of the lips and eyelids, and large urticarial weals covering the whole body appeared, followed by dyspnœa, collapse, cyanosis and audible wheezing. The symptoms were controlled by adrenaline. Intracutaneous and passive transfer tests were both positive. In another case (Schiff 1941) 57 injections of 25 mg. of thiamine were given weekly without ill effect. A few minutes after the 58th injection (6 injections had been already given from the same bottle, the last one 9 days previously) the patient developed nausea, vomiting, profuse perspiration and collapse; the pulse disappeared, respiration ceased and heart sounds became inaudible. Mills (1941b) reported a case of sudden death after parenteral administration of vitamin B_1; at autopsy multiple ecchymoses beneath the pia mater over both cerebral hemispheres with areas of encephalomalacia and perivascular hæmorrhage were found. Eisenstadt (1942) describes a woman of 31 who received 24 injections daily at hospital and afterwards had continuous treatment for 10 months without incident when suddenly, 5 minutes after an injection, angioneurotic œdema of the tongue, lips and eyes appeared with flushing and unbearable itching. Adrenaline controlled the symptoms in 15–20 minutes. Skin tests were positive but transfer tests negative. In another of his cases only local reactions appeared after 14 injections. Stiles (1941) reported 2 cases who had taken thiamine orally and by injections intermittently for years without any ill effect. After a considerable interval, thiamine injections ranging from 8–90 mg. were again given twice weekly; and—in one case soon after the new series of injections, in the other case after 5–6 months' continuous treatment—nervousness, flushing, tachycardia, profuse perspiration and tinnitus appeared within about an hour. Intradermal tests with thiamine were positive.

In all reported allergic cases the hypersensitivity developed gradually. In my case 1 the large doses of vitamin B_1 given 4–5 years before had caused no undesirable reaction; fairly severe allergic reactions, however, followed even after the first injection of the second course of treatment and the intensity and duration of attacks increased with subsequent injections. After the 5th and last injection—though there was some degree of recovery after 5–6 hours—the anxiety state, shortness of breath, palpitation, insomnia, tinnitus, headache and weakness persisted for 6–7 days.

The immunological response in the published cases quoted was similar to protein sensitisation, the incubation period needed to produce hypersensitivity always exceeding 7 days; with injections given at intervals of less than 7 days anaphylactic reactions were small or absent, and the most severe anaphylactic reactions followed intervals of 10 and 9 days. In my case 1, injections followed each other at 2–5 day intervals which may explain why reactions were not more severe. The hyperthyroid-like irritability as indicated by the continued restlessness, insomnia and fatigue was another feature of the case. The quoted cases seldom showed both types of manifestation, but possibly in the allergic cases the anaphylactic shock was so prominent that the observers omitted lesser clinical manifestations. Skin tests in case 1 became negative after desensitisation which was complete after 5 weeks of abstinence from vitamin B_1. Symptoms resembling thyrotoxicosis (case 2) seem to suggest simple overdosage.

Lack of vitamin B_1 is often only a part of a multiple deficiency, especially of the vitamin-B group. In hot climates the vitamin B requirement is much higher than in cooler regions, but food grown there contains considerably less of the vitamin (Mills 1941b). Deficiency diseases of the vitamin-B group are prevalent in hot climates (beri-beri, pellagra, tropical nutritional anæmia), and in temperate climates usually arise in the summer months. Thiamine is very soluble in water and easily absorbed; given as a pure preparation during summer it might convert a deficiency state suddenly into oversaturation. Case 2 and the similar published cases quoted all developed during the summer.

SUMMARY

Two cases are described in which long administration of vitamin B_1 produced severe symptoms. Case 1 had had large doses of vitamin B_1 by injection some years before without any ill effects, but after a course of injections of 25 mg. thiamine developed a condition like an anaphylactic shock, with eosinophilia of almost 35%.

Case 2 had symptoms resembling those of thyroid overdosage.

Published cases are compared with these.

I am indebted to Dr. D. C. Norris for the description of the attacks in case 1.

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PAROXYSMAL HYPERINSULINISM
DUE TO ISLET ADENOMA OF THE PANCREAS

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Note on the surgical aspect

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HYPOGLYCÆMIA due to endogenous hyperinsulinism is a comparatively rare condition, first described by Harris (1924). Since that time there have been a number of published groups of cases and reviews of the literature, among which the paper of Whipple and Franz (1935) may be mentioned in particular. The present case is described because the hypoglycæmic attacks presented features involving some fundamental problems in medical, psychiatric and surgical diagnosis.

CASE-RECORD

A married woman of 46 was referred to the Cassel Hospital in May, 1941, with a diagnosis of hysterical fits. She complained that she suffered from a series of attacks in some of which there was a disturbance of vision, in others shakiness, loss of the power of concentration, inability to speak and sometimes unconsciousness. Severe attacks involving loss of consciousness had become more common recently until they were at least of daily occurrence. Symptoms would last from a few minutes to an hour and a half. Between attacks she felt quite well. The first attack of unconsciousness had occurred 18 months before admission, though she had had minor symptoms for 6 months before that. She was on her way upstairs to bed after a Christmas party when she collapsed and was found by her maid lying on the floor. She could recollect no prodromal symptoms and could not explain what had happened. She continued to have such attacks at intervals and was thoroughly investigated for organic cerebral disease. Investigations were negative, and anticonvulsive drugs, given on the supposition that the condition might be epileptic, produced no improvement. It was then decided that the attacks must be psychogenic and she was treated by psychotherapy. Gradually the attacks became worse and associated with violent bodily movements and loud screams. Still with the idea that the illness was hysterical the patient was persuaded to enter a mental hospital. Treatment there produced no improvement and when convulsion therapy was proposed (the modern psychiatric panacea!) the patient discharged herself. Shortly afterwards, repeated physical examination having revealed no abnormality and the attacks resembling hysterical fits in general form, she was admitted to the Cassel Hospital.

The family history was normal. She had led a reasonably stable existence, first in business and then as a housewife. She had had a stillborn child 10 years before, after which there was occasional vomiting for a long time, apparently emotional in origin. She had had several attacks of abdominal pain in recent years which were presumed to be due to cholecystitis.

On admission she was having two major attacks every day, one during the early hours of the morning and one often about noon. The attack would begin with mental symptoms of which the patient appeared quite unaware; she would appear silly and irritable, with restless movements of body and limbs, and at times she would attempt to grasp the physician's hand. Next, twitching of the muscles around the mouth would be observed with alternate swallowing and protrusion of the tongue. By this time the speech would be slurred, but she would still respond to simple questions and would deny that there was anything the matter. Clonic convulsions would appear, principally of the left arm and leg, associated with violent and grotesque writhing movements of the body and loud inarticulate cries. This point might be reached in 15–20 minutes from the onset of the attack and was often the maximum development. Symptoms would then continue for about half an hour and die away leaving her exhausted but quite rational after about 1½ hours. There would subsequently be amnesia for the events of the attack.

During the first week no abnormal neurological signs were detected during the attacks or during the quite rational intervening periods. She gave a good history of her life and responded well to deeper psychological probing. A number of minor maladjustments and disharmonies were revealed, such as might be found in many individuals, but no adequate psychogenic basis for the attacks was revealed. The grotesque bodily movements and loud cries with some of the other symptoms mentioned bore a close resemblance to phenomena often observed in hysterical fits, and this had been the opinion of a neurologist of great clinical experience who had seen her shortly before admission. On the other hand, it is a wise rule to insist that a diagnosis of psychogenic symptoms be made only on a basis of positive psychiatric findings, particularly in the case of major hysterical symptoms arising for the first time in a patient of mature age.

The problem fortunately began to resolve itself when it was found that the patient bruised herself severely on several occasions and was once incontinent of urine during the attack. These findings pointed strongly away from the diagnosis of an hysterical disorder and were confirmed by the presence of patellar and ankle clonus and extensor plantar responses on two occasions. It was then necessary to decide what other agency could be responsible for these extraordinary periodic disturbances of consciousness. A cerebral neoplasm seemed to be excluded by the previous investigations, nor did a further lumbar puncture show any abnormality. Idiopathic epilepsy does not give rise to an attack of such long duration. "Status epilepticus" consists of a series of attacks whereas this was clearly one continuous fit. The same objection applies to the possibility of the attack being in reality a brief epilepsy followed by a long post-epileptic condition. Careful observation showed that this was simply not so. Spontaneous hypoglycæmia was next considered and it was immediately found that the administration of large quantities of glucose by mouth at the beginning of the attack would invariably abort it. Blood-sugar estimation showed a level of 21 mg. per 100 c.cm. at the beginning of the attack; the diagnosis of spontaneous hypoglycæmia was thus established

This condition may arise from a number of causes. It may be due to a disorder of the islets of Langerhans or to the presence of excessively functioning islet-cell tissue outside the pancreas. It may also be due to hepatic, renal, suprarenal or pituitary disease. According to Conn (1940), who has made a careful survey of the field, most cases are due to hyperinsulinism (with or without pancreatic adenoma) or to liver disease. Convulsions are rare in hypoglycæmic states resulting from renal, suprarenal or pituitary disease. The lowest fasting blood-sugar readings are given by patients with hyperinsulinism, and a fasting blood-sugar below 50 mg. per 100 c.cm. (the previous diet being normal) is said to indicate hyperinsulinism with very few exceptions.

In this patient the early morning fasting blood-sugar varied from 29 to 40 mg. per 100 c.cm., at which levels her mental state was often surprisingly normal. Ingestion of 3 oz. of glucose produced a rise from 40 to 73 mg. in 15 minutes; the level then began to fall again and in the absence of further carbohydrate a fit supervened. Indeed, it became increasingly difficult to carry out blood-sugar examinations beginning from the fasting state, because the patient began to develop more and more severe fits. The figures which were obtained, however, confirmed the diagnosis.

A high carbohydrate diet was given with the addition of 12 oz. of glucose every 24 hours. This regime greatly reduced the number of hypoglycæmic convulsions and the patient was transferred to Windsor Hospital under the care of Mr. Gaymer Jones, who describes the results of surgical exploration of the pancreas below.

DISCUSSION

We would like especially to comment on the differential diagnosis of these fits. In their earlier and milder form they had borne a remarkable resemblance to hysterical attacks, so that the patient had received extensive psychotherapy. This was perhaps not merely a misdiagnosis but rather a more fundamental misunderstanding which is all too common at present owing to the cleavage between the mental and physical aspects of the individual still implicit in many of our ways of thinking.

The hysterical fit differs sharply in some respects from other types of fit, yet it has features in common with them. Hughlings Jackson, in his work on the symptoms

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following the dissolution of the functions of the central nervous system, described a negative and a positive element. The negative element consists of the loss of function of the higher centres; the positive element consists of the release of lower centres from higher control. These phenomena may be observed whenever there is a dissolution of the functions of the central nervous system whatever the cause may be. Hysteria may be regarded as one such cause, hypoglycæmia as another. In the hysterical fit there is abandonment of higher control, whether wilful or unconscious is a matter for discussion, and a release of lower centres bringing a stream of emotionally toned and often highly symbolic activity. It is this emotional and symbolic quality of the "release phenomena" which gives the hysterical fit its characteristic appearance. Other agencies, such as hypoglycæmia, which inhibit the higher centres may produce, particularly in the early stages, very similar release phenomena. Later of course, as in this case, the failure of higher centres will spread to involve the upper motor neurones and other areas not involved in the hysterical attack. It is therefore dangerous to deduce from the appearance of the release phenomena in the early stages the nature of the inhibiting agent. Where the released activity is obviously symbolic and highly emotional, a mental conflict may be inferred with some certainty; but even so the mental conflict may not be the cause of the release—it may appear on the surface only when the higher centres are deranged by some other agent. There are few people without some degree of mental conflict; therefore if the character of the release phenomena is to be accepted as a criterion for the diagnosis of hysteria, mistakes will continue to be made. Such mistakes are fairly common: they occur in many other conditions, among which cerebral tumours, disseminated sclerosis, arteriosclerosis and presenile dementia are well-known examples.

Whether in this case we should have arrived at the correct diagnosis had we not been fortunate enough to observe definite physical signs is questionable. It should, however, be possible for the psychiatrist to whom such a case is referred, in the absence of positive physical findings, to inform his medical colleagues that the psychological findings in the case are insufficient to account for the symptoms. This is made easier by the fact that in our experience gross hysterical reactions have almost invariably a gross and not very deeply hidden immediate cause, and are generally grafted on the background of a personality showing a tendency towards hysterical manifestations in the earlier life pattern.

One other point worth mentioning is the abrupt onset of many of the attacks. This feature is mentioned in few of the recorded cases, in most of which the onset is slower and the whole attack lasts longer. The dramatic suddenness of the attacks here served to direct attention away from the true ætiology. Experience with induced insulin coma in the treatment of schizophrenia has taught us what a wide variety of symptoms and modes of onset may be encountered. It may be worth while to employ the term "paroxysmal hyperinsulinism" in cases like this one to emphasise that the attack is acute and relatively brief. The explanation of the fairly rapid, spontaneous recovery from deep coma (which occurs so much less readily in induced hyperinsulinism), raises biochemical problems far beyond the scope of our observations.

Our thanks are due to the director and staff of the Stafford county pathological laboratory for biochemical investigations and advice.

Surgical Aspect

MR. GAYMER JONES

The patient was admitted to King Edward VII Hospital, Windsor, on Aug. 4, 1941. She had 3 fits in the first 32 hours, which lasted an average of three-quarters of an hour. It was found necessary to give her 1 lb. of glucose in 24 hours in addition to a liberal diet in order to keep her free from fits. Fits were very apt to occur during sleep, the most usual time being between 5 AM and 6 AM. The glucose was given in two-hourly doses of 1½ oz. except that a double dose was given at midnight and at 4 AM and that she missed two glucose feeds during daytime when fits were less likely. A blood-sugar estimation on Aug. 12 gave the following results:

	Sugar (Folin-Wu) mg. per 100 c.cm.	True glucose c.cm.
During an attack (12.30 AM) ..	19 ..	5
After an attack (2 AM) ..	74 ..	67

A galactose-tolerance test disclosed nothing abnormal.

It was decided to operate and if a search failed to reveal an adenoma in the pancreas to remove as much of the pancreas as possible on the assumption that the increased insulin output might be due to a generalised hyperplasia of the islet tissue.

Operation on Aug. 14.—Weight 9 st. 2 lb. Anæsthetics: avertin, gas-oxygen and ether, and local. A high long left paramedian incision was made, and the pancreas approached through the gastrocolic omentum. The lesser sac was partially obliterated by adhesions, which ran along the course of the top of the pancreas. Careful palpation disclosed no tumour anywhere in the pancreas. It was decided therefore to remove as much as possible of the pancreas. This was done by starting at the tail, the peritoneum being divided along the superior and inferior borders. The pancreas was gradually lifted up from the splenic vessels by dividing and suturing the arteries and veins of supply. This part of the operation was tedious, because of the number of vessels which had to be dealt with, but not difficult; and when it had been completed the extreme tortuosity of the splenic artery was well displayed. The junction of the inferior mesenteric with the splenic vein was noted and the superior mesenteric vessels were demonstrated. There was a considerable length of pancreas between the inferior mesenteric vein and the superior mesenteric vessels. The dissection proceeded to the neck of the pancreas, which was astonishingly narrow and appeared to contain little pancreatic tissue. This change from body to neck was definite, and the tail and body were now attached only by a narrow pedicle which was beginning to widen at the point where section was made, just over the superior mesenteric vessels. The stump was tied by two ligatures penetrating the neck and then by one surrounding it; because there was so little tissue this was easy and it made the supervention of a pancreatic fistula very improbable. The portion of the pancreas removed weighed 36 g. and when measured (after a year in formalin) was found to be 5½–6 inches long. Two corrugated rubber drains were put down to the site of the operation and the abdomen was closed in the ordinary way. The wound drained a little serous fluid and, in order to prevent any possibility of erosion of the skin, the whole area was smeared thickly with aluminium paste at the first and subsequent dressings.

The incision healed completely in about a fortnight. Blood-sugar estimations were carried out on most days and showed a tendency to fall to 70–80 mg. per 100 c.cm. when glucose was discontinued. Near the end of the second week the patient again began to have fits. These were minor and infrequent to begin with, but gradually became more severe and commoner until it was necessary to give 2 oz. of glucose every 3 hours from 2 PM until 8 AM in order to keep her fit-free. It was clear that something further would have to be done but it was thought advisable to let her go home for a period in order that the immediate effects of the operation could subside. An examination of the excised portion of the pancreas did not disclose any adenomata and its histology was normal.

While the patient was at home it was found necessary to give her increasing amounts of glucose at 2-hourly intervals until she was taking 1½ lb. in the 24 hours. During the night her husband had to arrange for this by setting an alarm-clock to go off every 2 hours. Such amounts of glucose were difficult to obtain in war-time. She was readmitted on Jan. 12, 1942. Her weight had gone up considerably and even after 17 days of treatment was 11 st. 4½ lb. on the day of the second operation—an increase of 2 st. 2½ lb. in the interval since the first operation. Her appearance also had changed remarkably. She was now curiously blown up about the face and neck and there was an enormous amount of fat around her body. The act of speaking made her short of breath.

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A blood-sugar curve carried out on Jan. 14 gave the following readings:

	Blood-sugar mg. per 100 c.cm.
Fasting	62
After glucose 50 g.: ½ hr.	141
1 hr.	113
1½ hrs.	42
2 hrs.	27

There was no sugar or acetone in the urine throughout the test. During the 12 hours preceding the test the patient had only taken glucose: it was necessary to allow this in order to prevent fits. The amount taken was 1½ lb. in 30 oz. of water. An endeavour was made to reduce her weight by cutting down the glucose to ¾ lb. in 24 hours and giving a much lighter diet. On this treatment she remained almost, but not quite, free from fits.

The second operation was performed on Jan. 29, it having been decided now to remove as much as possible of the head of the pancreas if an adenoma should again not be found. Anæsthetics: avertin, gas-oxygen and ether, and local. No intravenous glucose was given. The abdomen was opened by a right paramedian incision. The head of the pancreas was first palpated in situ and since no adenoma could be felt the duodenum and head of the pancreas were mobilised by dividing the peritoneum all round the right side of the curve of the duodenum; this allowed these structures to be brought well up into the wound although the patient was fat. They were taut in this position and could be examined with a finger in front and a thumb behind. A localised tumour was then palpated in the middle of the head of the pancreas, towards its anterior aspect. This area showed as dull pink in the yellowish-white of the surrounding pancreas, in the manner described by Whipple (1936). A small incision was made on the anterior surface and with a little blunt dissection an adenoma was shelled out without difficulty. There was one bleeding point which clearly represented its vascular supply. This was ligatured and the pancreas and duodenum allowed to fall back into position. The liver looked as if some fatty infiltration was present; the gall-bladder was found to contain a few stones but it was thought better not to perform a cholecystectomy after the lower end of the common bile-duct had been manipulated. The stones were therefore removed and the gall-bladder drained. The appendix showed no evidence of disease and was not removed. A drain was placed down to the head of the pancreas and the abdomen was closed.

The patient was little disturbed by the operation and was discharged with the wound well healed 21 days later. A glucose-tolerance curve done the day before she left showed:

	Blood-sugar mg. per 100 c.cm.
Fasting	128
After glucose 50 g.: ½ hr.	171
1 hr.	221
1½ hrs.	210
2 hrs.	210

The urine when she was fasting and 2 hours after glucose contained no sugar. The pathologist remarked: "This seems to indicate a mild diabetic phase with a raised renal threshold."

The adenoma consisted of three small round tumours grouped into one mass, and weighed 1·31 g. Burtness and his colleagues (1941), in describing a similar case, estimate the approximate amount of islet-cell tissue in an average pancreas as 2·25 g.; therefore the adenoma removed in this case represented an increase in the insulin-secreting tissue of nearly 62·7%. The pathological report upon the tumour states: "The tumour measuring approximately 2 cm. by 1·2 cm. is well encapsulated. Microscopically it shows areas of compact cuboidal cells associated with others in which similar cells form vesicles of varying sizes. In an occasional vesicle the epithelium projects inwards as a papilla. There is a scanty stroma of connective tissue. The picture is similar to that seen in the thyroid in thyrotoxicosis." Analysis of one of the gall-stones showed it to be composed of cholesterol and bile pigment.

The diastatic index on Feb. 18 was 25 units, estimated on a 24-hour sample of urine. Removal of a large amount of pancreas therefore had not produced any effect. Analysis of the fats in dried fæces on March 23 gave: neutral fats 8%, fatty acids 5·1%, soaps 8·9% (22% in all). The total fat therefore was within normal limits although the proportion of unsplit fat was a little high.

Since leaving hospital the patient has kept well and had no fits. On Aug. 27, 1942, her weight was 9 st. 4 lb. and she "had never felt better." A galactose-tolerance test disclosed no abnormality of liver function. Microscopical examination of the fæces showed no excess of undigested food and no evidence of defective fat splitting. Further glucose-tolerance tests on that date (A) and on July 14, 1943 (B), gave the following readings:

	Blood-sugar mg. per 100 c.cm. (A)	(B)
Fasting	161	80
After glucose 50 g.: ½ hr.	256	136
1 hr.	266	136
1½ hrs.	221	107
2 hrs.	182	75

No acetone or sugar in the urine.

DISCUSSION

This case illustrates the fact that before excluding the presence of an islet adenoma the duodenum with the head of the pancreas should be mobilised in order that proper examination of the head can be carried out. It is interesting that Whipple and Bauman (1941) report 3 cases in which, since no tumour was found at the first operation, three-quarters of the pancreas was resected—without result. In each case a second operation was performed and when the duodenum was mobilised an adenoma in the head of the pancreas was found and removed. Rudd and Walton (1941) describe a case in which the adenoma was situated in the gastrosplenic omentum about 1 in. beyond the lower part of the tail of the pancreas. It is clear therefore that the search should also extend *beyond* the pancreas. An adequate search requires wide exposure of the pancreas and it is probable that a transverse incision offers the best approach. Whipple (1935, 1936) describes this incision dividing both recti, and Walton used it in his case.

There seems to be no need or even justification for removal of the spleen when resecting the tail and body of the pancreas for non-malignant conditions. Removal of the spleen would certainly not have made the first operation described above any easier and if the contention of those who adopt this procedure is that it overcomes the difficulty of separating the pancreas from the splenic vessels, they are giving this difficulty too much emphasis. Removal of the spleen may even lead to trouble if the splenic vessels are lifted up and removed with the pancreas, because the inferior mesenteric vein may be encroached upon and damaged. The removal only of that part of the pancreas to the left of this vein would be quite insufficient to cut down the insulin supply.

The evidence of fatty infiltration of the liver fits in with the experimental findings discussed by Orr (1941); he quotes experiments performed by Dragstedt and by Boyce. It seems that this fatty infiltration is due to the actual removal of part or the whole of the pancreas and not to the absence from the intestine of its external secretion. It does not develop for instance if the ducts are severed or ligatured and the pancreas is left in situ. In the present case the galactose-tolerance curve did not show any loss of liver function associated with the infiltration.

The slight tendency for the glucose-tolerance curve to be of the diabetic type following the removal of the adenoma conforms with the findings of Whipple and Bauman, who also showed that after a period which may be as long as 2 years glucose utilisation assumes the normal rate. They point out that this return to normal occurred even in their 3 cases in which three-quarters of the pancreas had been removed, demonstrating that the human pancreas, like the kidneys and liver, has an enormous functional reserve. In my case the diabetic type of curve still persists 7 months after the second operation. Though about 75% of the pancreas must have been removed at the first operation

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the continuation of the fits showed that this did not balance the presence of a tumour which only contained insulin-secreting tissue equal in quantity to 62·7% of that present in an average pancreas. This suggests that the insulin-producing function of the cells in an adenoma is greater than that of normal cells. Owing to war conditions it was impossible to investigate the insulin-producing properties of the cells of the adenoma.

Loss of that part of the pancreas distal to the head, though equal to about three-quarters of the total pancreatic substance, did not interfere with the digestion of fat, starch or protein.

Summary

A case of hypoglycæmic convulsions due to a tumour of the islet cells of Langerhans in the pancreas had been under observation for nearly two years before admission to the Cassel Hospital and a diagnosis of hysteria had been reached.

The term "paroxysmal hyperinsulinism" is suggested to describe cases of this type with a sudden dramatic onset of the hypoglycæmic fit.

At a first operation the tail and body of the pancreas were removed without improvement of symptoms; at a second operation an adenoma was found in the head of the pancreas only after the duodenum and the head had been mobilised. The adenoma was shelled out and the patient recovered.

Mobilisation of the duodenum and head of the pancreas is necessary in every case where an ordinary search for such an adenoma has failed.

I should like to thank Sir Arthur Hurst and Dr. George Graham for their helpful advice; Dr. N. F. Maclagan and Dr. E. Sayle for their help with the pathological investigations; and Mr. N. A. Miller for kindly assisting me at the operations.

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PROSTATIC ENLARGEMENT
TREATED BY THE BRAASCH-BUMPUS PUNCH

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TREATMENT of prostatic enlargement by the perurethral route has been extensively employed during the past 10 years, but there is still some difference of opinion about the scope of the procedure, the best available method, and the permanence of results as compared with suprapubic enucleation.

In one general surgical unit at the Victoria Infirmary, during the past 8½ years, the circular knife method of resection has been used in over 100 patients with bladder-neck obstruction. Our decision to try the perurethral method of prostatic resection in 1934 implied some dissatisfaction with results over the previous 10 years. These are summarised in table I. The mortality figures

TABLE I—MORTALITY IN 111 CASES OF PROSTATIC OBSTRUCTION (1924–33)

—	Cases	Deaths	Mortality (%)
Suprapubic enucleation ..	64	12	18·7
Suprapubic cystostomy ..	25	14	56·0
Catheterisation only ..	22	7	31·8

for suprapubic enucleation, usually a two-stage procedure, are high. It is true that during the earlier years at least, the value of indwelling catheter drainage, and the technical refinements of the Thomson Walker one-stage operation had not been thoroughly appreciated. The salient fact remained, however, that there was a large group of patients for whom suprapubic enucleation of the prostate was too formidable a procedure. We turned to perurethral resection as a possible solution of the problem of the poor-risk patient, and an attempt to eliminate as far as possible the misery of permanent suprapubic drainage.

CHOICE OF METHOD

Most surgeons in this country have preferred the McCarthy instrument for endoscopic resection. Here the cutting is done by a wire loop carrying a high-frequency current. High-frequency cutting currents have the disadvantage, however, that unless accurately controlled, they may heat the tissues in the vicinity of the actual site of burning beyond their thermal death point. This leads to sloughing and sepsis.

On theoretical grounds, the circular knife method of resection, in which only a coagulating current is used for hæmostasis, seemed safer. We were further influenced in our choice of method by the fact that one of us (R. M.), while on the staff of the Mayo Clinic nearly 20 years ago, saw Bumpus getting excellent results by this method in minor types of prostatic obstruction.

The Braasch-Bumpus resectoscope is a direct vision instrument with a fenestrum near the beak in which the prostatic tissue is engaged and then excised by a circular knife. Hæmostasis is secured either by a multiple needle electrode before cutting, or by coagulation of bleeding points later by a single point electrode. This instrument has since been freely modified by Gershom Thompson [1] to permit of more rapid resection. We have used a Thompson resectoscope of smaller calibre (24 F) in a few of our later cases where the larger Braasch-Bumpus instrument (30 F) could not be introduced.

Though Young of Baltimore must be given the credit for the introduction of the "punch" method of prostatic resection, it is at the Mayo Clinic that the method has been extensively developed. Up to 1930, only the lesser degrees of bladder-neck obstruction were dealt with perurethrally; these comprised the small fibrous prostate, the median bar obstructions, and the smaller adenomatous enlargements, chiefly of the so-called middle lobe. Collectively they represented only 15% of the total number of patients treated for prostatic obstruction. From 1930 onwards, the method was extended to deal with almost every type of adenomatous enlargement, so that by 1933, 98% of the patients were dealt with perurethrally. Coincident with this, the amount of tissue removed at one or more sittings was increased up to 40 g. or more in the case of the large prostates. The aim during this period was not only to produce good immediate results even with the largest prostates, but to achieve a permanency of relief which would be comparable to that obtained by the open operation. More recently stress has been laid on the shortening of the period of hospitalisation. Many patients are in and out of hospital within a week.[2] This means that in a bulk of the cases, the preoperative period is cut down or dispensed with altogether, and that from the standpoint of eligibility or readiness for operation, rather less importance than formerly is attached to urinary sepsis and high blood-urea values. At the Mayo Clinic also in cases with much renal damage it is considered safer to drain by the urethra for a short period than to perform a cystostomy and drain for a much longer period in order to obtain better renal function values.

TECHNIQUE

Preoperative care.—At the Victoria Infirmary, we considered careful preparation just as important in perurethral resection as in suprapubic enucleation. Patients admitted with retention—and the vast majority were in this category—were drained with the Foley self-retaining catheter. In the average case, the patient was ready for operation in 10 days. In a large number, however, longer periods of preparation were necessary before urinary output was sufficiently increased, and blood-urea and urea-clearance values stabilised. In the worst cases, where drainage beyond two weeks was necessary, or the indwelling catheter was badly tolerated, we did not hesitate to do suprapubic puncture, and occasionally to send the patient home for a month or two, provided home conditions were satisfactory.

1. Thompson, G. J. *Proc. Mayo Clin.* 1940, **49**, 780.
2. Wardill, W. E. M. *Lancet*, 1941, **ii**, 127.

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Gershom Thompson, in his plea for the short hospitalisation of these patients, has compared the elderly prostatic sufferer to a foundered horse, in that once he is down, it is difficult for him to get up. We agree it is advisable to get the patient out of bed within a few days after operation, but we are still convinced that in the case of the average patient with whom we have to deal in general hospital practice, a preoperative period of 1–3 or even 4 weeks is always beneficial, and brings many an apparently hopeless case within the range of successful surgical treatment. Like Thompson we have come to attach less importance than formerly to actual blood-urea and urea-clearance figures, provided they were stabilised; and in several instances we have operated successfully on patients admitted to hospital with blood-urea values of 200 mg. and above, but stabilising after adequate preparation to between 100 mg. and 120 mg.

Selection of patients.—The guiding principle was the reduction of mortality in the poor-risk patient, who was found for the most part, though by no means exclusively, in the 65–80 age-group. We started on the assumption that if, by perurethral resection, relief could be obtained for a period of 5–10 years, this would cover the average life expectancy of this advanced-age group. On the other hand, in the younger 50–65 group, with a life expectancy up to 20 years or more, we felt justified in dealing with the fibrous prostates, bar obstructions, and smaller adenomatous enlargements perurethrally, but we continued for the most part to enucleate the largest prostates suprapubically, unless this was rendered inadvisable by the poor physical condition of the patient. It was felt that in the case of the largest prostates, with limited experience, and within the arbitrary operating time-limits which we imposed upon ourselves, we could not hope to remove the large amounts of prostatic tissue which would make the final result comparable with that obtained by open operation. To redress the balance by lengthening the operating time, or by having recourse to two or more sittings, appeared to detract from the essential safety of the procedure, and to present no decided advantage over one-stage suprapubic enucleation. Occasionally the choice of open operation was conditioned by inability to introduce the punch, while in 2 cases, enucleation followed failure to relieve obstruction perurethrally.

Operation.—For anæsthesia, light open ether with plenty of oxygen was preferred. In earlier cases low spinal anæsthesia was used; this certainly facilitated the introduction of the resectoscope, and permitted working in a relatively bloodless operation field. This advantage was, however, offset by the increased reactionary bleeding after the patient returned to the ward. With ether, on the other hand, the pressure is maintained, bleeding points are readily seen and controlled, and the danger of massive postoperative hæmorrhage is reduced to a minimum.

The large Braasch-Bumpus punch (30 F) is often difficult to introduce, and usually the external meatus must be dilated with straight bougies. Using the punch as a direct cystoscope, the bladder neck is first examined to determine the disposition of the obstructing masses. The operation is begun by removing some prostatic tissue from the posterior rim of the bladder neck. This facilitates manipulation of the instrument within the bladder, and the lateral intravesical projections are then removed methodically, starting from within the bladder and working towards the prostatic urethra. The tissue is first coagulated with the 5 prong electrode. We tended at first to over-coagulate, at times getting necrosis, sepsis, and slight secondary hæmorrhage as a result. Preliminary coagulation was therefore cut down to a minimum and most reliance was placed on the single-point electrode at the end of the operation.

The excised portions of prostate are flushed out of the bladder or removed by special forceps. The use of 1% citrate solution as the irrigating lotion reduces clotting and keeps the field of vision clear. The insertion of a Foley self-retaining catheter completes the operation. The operating time has been kept down to 30 minutes, which includes the time of induction of the anæsthetic. After a little practice, we were able to remove about 10 g. or more of tissue in this time. If the lateral lobes were fairly large, and the removal of more tissue was advisable, this was deferred to a second operation 10 days to 2 weeks later. A second operation was done in only 5 patients. In the minor degrees of obstruction, the removal of 3–5 g. of tissue was usually sufficient.

In the after-treatment, the bladder is irrigated every half hour during the first 24, and every hour during the second 24. The urine is often clear after 24 hours, and almost invariably after 48. The catheter is removed on the fourth to sixth day and the patient allowed up. In an uncomplicated case, he is allowed home on the seventh to the tenth day.

Complications.—The postoperative course is usually uneventful and quite afebrile. Complications are due in the main to technical faults. Sepsis is the most serious, and is due mainly to overcoagulation. It shows itself by a swinging temperature between the seventh and twenty-first days, and there may be associated hæmorrhage, though in only one case in our series has this been profuse. The single case of primary clot retention was due to a mistake in using lotion much too hot for irrigation so that the bladder was burnt. This unfortunate patient also furnished our single instance of partial incontinence, which persisted for several months and then improved. Patients often complain of slight lack of control for a few days after the removal of the catheter, but with the exception of the case mentioned above, this has never lasted beyond 10 days. The single case of rectal fistula, due probably to overcoagulation, emphasises the need for extreme care in operating in the middle line posteriorly. Penile stricture is mainly due to trauma associated with the large size of the instrument. It occurs in the anterior urethra, usually just behind the meatus, though in one of our cases there was a more extensive fibrosis involving most of the length of the urethra.

Technical experience is the main factor in avoiding complications. This is borne out by the fact that with one or two exceptions, all complications occurred in the first series of 50 cases. In the whole series of 101 cases complications were as follows: clot retention, 1; sepsis, 5; epididymitis, 4; secondary hæmorrhage, 3; stricture, 2; incontinence, 1; rectal fistula, 1.

RESULTS

In the series of 101 patients submitted to perurethral resection, there were 10 cases of malignant prostate. In 13 patients suprapubic cystostomy was carried out as a preliminary measure, because it was impossible to pass a rubber catheter, the indwelling catheter was not tolerated, or drainage had to be prolonged beyond the usual 10-day period. In another 7 patients, permanent suprapubic drainage had been instituted at periods varying from 3 months up to 5 years before admission.

The eldest patient in the series was 87 and the average age just over 69. There were 7 deaths in the series, of which 5 occurred in the first 50 cases and only 2 in the second 50. This improvement in mortality figures was due partly to increasing technical experience, and partly to a realisation that the method had its limitations and that not every patient could be made safe for it. The results were classed as good in 68, fair in 15, and unsatisfactory in 11. The last group included patients who had to have subsequent enucleation because of failure to relieve obstruction by the punch; patients in whom frequency and bladder discomfort remained prominent; and cases of non-malignant enlargement with recurrence of symptoms within 2 years after operation. We have had a very few recurrences after 3 and 4 years, but in most cases relief has been obtained for periods of 5 years and more.

In the relatively younger and fitter patients with a large prostate, suprapubic enucleation is still in our opinion the operation of choice, but the perurethral procedure is a great advance in the treatment of the older and frailer patients. In general hospital practice this latter group is in the great majority, and the choice otherwise would lie between permanent suprapubic drainage and a hazardous removal by open operation.

The drop in mortality attributable to the introduction of the punch operation becomes especially significant when taken in conjunction with the rise in the oper-

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ability-rate over the same period. During the period 1924–33 (table I) only half the patients admitted with prostatic obstruction were considered fit for suprapubic enucleation, and as the high death-rate shows, this was too optimistic an estimate.

The mortality-rate in the total series of 192 cases treated in the years 1934–41 is set out in table II; it

TABLE II—MORTALITY IN 192 CASES OF PROSTATIC OBSTRUCTION (1934–41)

—	Cases	Deaths	Mortality (%)
Suprapubic prostatectomy	35	1	2·9
Perurethral punch ..	101	7	6·9
Suprapubic cystostomy ..	25	10	40·0
Catheterisation only ..	31	21	67·7

shows that from two-thirds to three-quarters of the total number of patients admitted with prostatic obstruction have a good chance of permanent relief from their symptoms, and many of them are saved from the gloomy prospect of permanent suprapubic drainage. Of administrative interest is the fact that the average stay of these patients in hospital has been cut by more than half.

There remains a hard core of prostatic sufferers, amounting to about a quarter of the total admissions, who are beyond surgical aid. Many die within 48 hours of admission. Perhaps in the future the knowledge that relief can be obtained by a relatively minor procedure will encourage such patients to come earlier for treatment.

The method is most useful in cases of fibrous prostate, in medium adenomatous enlargements, and in the palliative treatment of malignant prostate. As general surgeons with restricted numbers of cases, we cannot claim to have explored all the possibilities of the operation. The final evaluation must rest in the hands of those younger urological surgeons in this country who with abundant opportunity for technical improvement are following the Mayo Clinic lead and practising the method exclusively.

SUMMARY

During the past 8½ years, 101 patients with prostatic obstruction have been treated by the Braasch-Bumpus punch.

The operation is safer than suprapubic enucleation, and therefore more suitable for the older and frailer patients who bulk so largely in general hospital practice.

The method is most useful in dealing with the fibrous prostate, the medium adenomatous enlargement, and in the palliative treatment of malignant prostate, but with the requisite skill and experience almost any degree of prostatic enlargement can be successfully dealt with.

HIPPURIC-ACID EXCRETION AND URINE VOLUME

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A SIGNIFICANT positive correlation is said to exist between the amount of hippuric acid eliminated by the kidneys and the volume of urine secreted during the same period. This conclusion is based on an analysis of a series of hippuric-acid synthesis tests on 100 patients with suspected liver disease who were given an intravenous injection of an excess of sodium benzoate. Higher than normal values for hippuric-acid excretion were associated with large volumes of urine. Low values in some patients with hepatic disease could be increased to normal or above by inducing water diuresis.

In tests which I have carried out on 153 unselected menopausal women a wide range of values for hippuric-acid excretion was observed. The tests were done by the intravenous modification of Quick's hippuric-acid synthesis liver-function test.[1] The calculated mean and standard deviation for hippuric acid excreted during the first hour was 1·25 ± 0·26 g. with an extreme range of 0·41 to 1·86 g. The calculated mean and standard deviation for the volume of urine excreted during the same period was 133 ± 71 c.cm. with an extreme range of 32 to 360 c.cm.

In order to determine whether or not a real correlation exists between grammes of hippuric acid and volume of urine excreted in normal persons a correlation coefficient was calculated from the data obtained from this control series. The coefficient r was 0·27 ± 0·08 ($t = 3·53$, P = less than 0·01). This represents a significant positive correlation and confirms the findings of Machella et al.[2]

The control data were further analysed by arranging the tests numerically with respect to the volume of urine excreted in each test and determining the average grammes of hippuric acid excreted in each consecutive group of 25 tests. These values are shown in the last column of the table. It will be observed that the average value increases at first as the volume of urine increases, but that, from the 3rd group on, values remained relatively constant.

Test numbers	Range of urine volumes (c.cm.)	Av. value hippuric acid excreted (g.)
1– 25 ..	32– 65 ..	1·01
26– 50 ..	67– 90 ..	1·23
51– 75 ..	90–113 ..	1·32
76–100 ..	114–146 ..	1·33
101–125 ..	148–188 ..	1·28
126–150 ..	190–325 ..	1·30

Four separate correlation coefficients were calculated respectively for the first 75 tests, the first 100 tests, the last 75 tests and the last 50 tests. That found to have the greatest statistical significance was the correlation coefficient for the first 100 tests—its value being 0·43 ± 0·08 ($t = 5·27$). This seems to indicate that the weight of the positive correlation in the entire series was borne by the group of tests where the volume of urine was less than 150 c.cm. There was no significant correlation in the groups comprising the last 50 or last 75 tests.

It is concluded that abnormally low values obtained for hippuric-acid excretion for the first hour may be inaccurate if the volume of urine secreted during the same period of time falls below 150 c.cm. In order to avoid this error in the use of the test enough water should be administered when the test is started to ensure a urinary output of at least 150 c.cm. This can usually be accomplished by giving 200 c.cm. of water by mouth at the time of the intravenous injection.

1. Quick, A. J. *Amer. J. digest. Dis.* 1939, 6, 716.

2. Machella, T. E., Helm, J. D. and Charnock, F. W. *J. clin. Invest.* 1942, 21, 763.

New Inventions

AN AUDIBLE WARNING OF EMPTY GAS CYLINDERS

IN straight circuits failure of the oxygen supply is inaudible and is often not noticed till cyanosis appears. The pressure gauge on the oxygen cylinder encourages

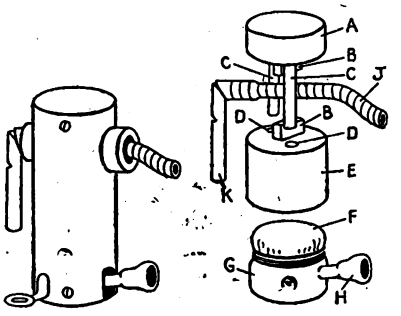

Fig. 1 Fig. 2 Fig. 3

the anæsthetist to run the cylinder until it is completely empty, and at the critical moment he may omit to watch the rotameter. In carbon-dioxide absorber circuits neither oxygen nor N_2O nor for that matter cyclopropane

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is audible, and the failure of any one of these gases, particularly oxygen, can be a great nuisance.

The apparatus here described (fig. 1) gives audible warning of failure of gas pressure; it was made by a local plumber out of scrap material. The illustrations are half scale.

The "saucepan" G (fig. 2) is surmounted by a thin rubber diaphragm F which rises when it is fed with gas from the reduction valve at the normal 5 lb. to the square inch or so, and is of course in parallel with the rotameter or other instrument. The diaphragm balloons, as in the ghost fig. 3, and raises the plunger E. As a result the tube J feeding the whistle is nipped between the *very* blunt knife edges B and B, as shown in fig. 3. The whistle K, which is supplied with air under pressure from an ordinary Junker bulb (not shown), is then unable to sound. When the gas pressure to the apparatus fails (empty cylinder, kinked or pinched tube, or otherwise) the plunger E falls and the whistle sounds. The rods C and C work in their holes D to compel the rising knife edge on the plunger B to keep vertically in line with its mate on the fixed upper member A.

I have two of these gadgets bolted side by side to my rotameter plus carbon-dioxide absorber circuit; the two are fed by a single Junker bulb. I have had them in use for over a year with satisfaction.

W. H. MARSHALL, MB CAMB.

Reviews of Books

Studien am menschlichen Sperma

CHARLES A. JOËL. (Schwabe. Pp. 154. Sw. fr.20.)

THIS book is intended as a comprehensive account of the human spermatozoon, the discovery of which Dr. Joël rightly attributes to the elusive Johann Ham, and not, like so many authors, to Leeuwenhoek. The author follows carefully the early history of our knowledge of spermatozoa and his arrangement of the material and full references will be valuable to later historians of the subject. On modern matters the standard of the book varies. It includes a useful account of Dr. Joël's own study of 1330 ejaculates, with technical details of collection, preparation and microscopical study, and with figures of the various kinds of abnormal spermatozoa and other bodies sometimes occurring in semen. He considers that human spermatozoa live up to 48 hours in the woman's body. The account of the enzymes of semen is useful. The part of the book concerned with chemical action on spermatozoa is the weakest. The old work of Kölliker, Günther and Gellhorn is described, but the large modern studies of the subject under the Birth Control Investigation Committee and other bodies are scarcely mentioned. The study of chemical contraception has been mainly British and American, and the outlook of this book is essentially mid-European. The works of Baker, Dickinson and Voge are not mentioned, and among a total of 538 references only four are to the *Journal of Contraception*.

Diseases of the Breast

Diagnosis, Pathology, Treatment. CHARLES F. GESCHICKTER, MA, MD, with a section on treatment in collaboration with MURRAY M. COPELAND, AB, MD, FACS. (Lippincott. Pp. 829. 72*s*.)

CONCEPTIONS of the pathology of the mammary gland have undergone profound changes during the past twenty years, which have had their effect on diagnosis and treatment. There is thus room for this book, which gives a full account of breast pathology from the modern standpoint. The endocrinology of the mammary gland is reviewed, including the results of animal experiments and the interpretation of histological studies. Evidence on which endocrine treatment of the different forms of "chronic mastitis" are based is clearly set forth, with details and results of treatment. The end of it all, after 280 pages, is the statement that "the best form of endocrine therapy in all forms of chronic cystic mastitis is normal pregnancy and lactation, and this should be recommended to the patient whenever feasible." This counsel of sanity is not new: it was expressed twenty years ago by Keynes (*Brit. J. Surg.* 1923, 11, 89). Artificial endocrine therapy has a limited place, and may even have dangers. The statistical basis for estimating the relation of chronic mastitis to cancer is notoriously difficult to free from error, yet there does seem to be some evidence that innocent epithelial hyperplasia in the mammary gland indicates a predisposition to cancer. The value of irradiation in combination with surgery in the treatment of mammary cancer is underestimated, it seems, in the USA. This may be because of different standards in dosage; in the Baltimore clinics the dosage given is much lower than that customary in this country. Advocates of radical surgery do not always face squarely the problems which they themselves create; thus even in this otherwise comprehensive book lymphatic œdema of the arm, a common sequel of radical surgery, is completely ignored. A reference is made to œdema caused by axillary metastases, but the only form of treatment offered is one that has long since been discredited. Taken as a whole, this is the important contribution to the subject of breast pathology and surgery which might be expected from the school of Halsted and Bloodgood.

The Foot

(3rd ed.) NORMAN C. LAKE, MD, MS, D SC LOND., FRCS. (Baillière. Pp. 432. 15*s*.)

IN the third edition of this useful book much new matter has been added on such clinical conditions as trench foot, march fracture, immersion foot and foot fatigue in industry and the Services. The addition of figs. 13–17 is somewhat unfortunate. When fig. 15 was published originally Pocock (*Brit. med. J.* 1942, i, 454) suggested that the drawings of the feet labelled "macaque" and "gibbon" were so unlike the feet of these animals that they had possibly been labelled in error. The footnote, on p. 33 of the book, does not meet his well-founded objections to the representation of the foot of the "mountain" gorilla (unfortunately depicted again in fig. 76). The point at issue is not whether this gorilla is a separate species, but that the figure of its foot as given by Akeley is not a just representation of the foot of any gorilla. It is also a pity that fig. 8 (present in previous editions), designed to show the relative proportions of the tarsal and pretarsal elements in embryo and adult, does not accurately maintain the proportions of the original figure of Schultz from which it is taken. Criticism of these details cannot detract from the merits of the book as a whole. The sections that they illustrate are more or less ornamental introductions to the main subject and it is upon the first-hand observations of clinical conditions (rather than the contributions of clinicians to the subject of the morphology of the foot) that the book is to be judged. Estimated by these it clearly meets a definite need, and meets it well.

War-time Food for Mother and Child

GEOFFREY H. BOURNE, D SC. (Oxford Univ. Press. Pp. 78. 2*s*. 6*d*.)

THIS small book contains an astonishing amount of information, much of it not easily found elsewhere, about the nutritional needs of pregnant and nursing mothers, of embryos and of children, and about the means of satisfying them. It is largely concerned with the accessory food-factors, mineral and organic, their sources, preservation, administration and dosage, with the balance of the diet, and the optimum quantities of the staple war-time foods. Dr. Bourne states his facts exactly and with restraint, though he seems to put the claims of the accessory food factors as chief determinants of health rather high and to hope greater things from dietetic reform than clinical experience appears to justify. It is not quite clear for whom the book is intended. Its language is non-technical, though it sometimes lapses into laboratory jargon, and it contains detailed advice and practical hints in plenty; but the practical suggestions are interspersed and hedged about with tables and decimal points which may discourage busy mothers in search of simple directions, and will not greatly enlighten the erudite. Perhaps it will be most useful as a thought provoker to those who have to feed mothers and babies or to advise them about their diet and who have become set in their ways. Here are facts and propositions to unsettle them and make them think.

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THE LANCET

LONDON: SATURDAY, OCTOBER 16, 1943

TREATMENT OF THYROTOXICOSIS WITH THIOUREA

IN August we reviewed progress lately made in the study of exogenous substances which inhibit or modify the physiological activity of the thyroid gland. We noted that the goitrogenic effect of certain plants of the brassica family, observed several years ago, seems to be of the same general kind as the more recently discovered antithyroid effect of certain sulphur-containing compounds; it is characterised in laboratory animals by the somewhat odd combination of hypothyroidism and thyroid hyperplasia. In conclusion we referred to the suggestion of the American worker, E. B. ASTWOOD, that thiourea and probably other similar compounds would be useful clinically in the treatment of hyperthyroidism. In the meantime further results have been recorded by R. H. WILLIAMS and G. W. BISSELL[1] who report favourable results following treatment with thiouracil of nine patients showing thyrotoxicosis. The total daily dosage during the first three weeks of treatment was 1·0–1·2 grammes; during the second three weeks the dosage was gradually reduced. Within three to seven weeks from the initiation of treatment the clinical evidence of thyrotoxicosis had disappeared and the basal metabolic rate, initially + 88 to + 36, had reached normal levels. In 6 of the patients the thyroid gland progressively decreased in size and in 2 it ultimately returned to normal. No serious complications were encountered, though in 2 of the patients a slight transient swelling of the legs was observed in association with a slight increase in the serum chloride and a decrease in the carbon-dioxide combining powers of the blood. WILLIAMS and BISSELL also made the interesting observation that the simultaneous administration of thiouracil does not prevent the increase in the basal metabolic rate caused by the administration of desiccated thyroid to myxœdematous subjects.

Today we are able to publish confirmatory observations in this country by Professor HIMSWORTH who records remarkable alleviation, following administration of 1 g. of thiourea three times a week, of all the symptoms in a severe case of thyrotoxicosis. The details given leave little doubt of the highly specific effect of this substance in the treatment of what has hitherto been a refractory condition, and there is ample justification for his conclusion that in thiourea and compounds with a similar action the clinician has obtained agents superior to any previously available for the treatment of thyrotoxicosis. So far it appears that only thiourea and thiouracil have been used clinically, but a large number of other sulphur-containing substances can be demonstrated to have the same antithyroid effect in animals. Quite recently ASTWOOD[2] has recorded the results of an extensive research on the relative effect of 106 chemical compounds. In each case the substance was administered in the food or drinking water for a period of 10 days, and the degree of thyroid hyperplasia estimated by gross and microscopic examination was used as a criterion. ASTWOOD found that antithyroid activity was shown by two classes of substances—thiourea derivatives and certain aniline derivatives. Of the former, the following were more active than thiourea, in decreasing order of activity: 2-thiouracil, 2-thiobarbituric acid, *sym*-diethylthiourea and 5-benzal-2-thiohydantoin. The effective aniline derivatives included the sulphonamides, *p*-, *m*-, *o*-aminobenzoic acids, *p*-aminophenyl acetic acid and *p*-aminoacetanilide. Thiocyanates were found to cause thyroid enlargement only in the absence of added iodine, while organic cyanides were ineffective.

Great interest attaches to the mechanism whereby these antithyroid substances work, and any hypothesis must allow for two established facts: first, that the coincident administration of thyroxine abolishes the systemic effect, which is not due, therefore, to peripheral neutralisation of the effect of the thyroid hormone; secondly, that hypophysectomy abolishes the thyroid hyperplasia, but not, of course, the hypothyroidism. At present it is thought that the direct and immediate action of the substance is to interfere with the synthesis of thyroid hormone, either by preventing the iodination of tyrosine or by preventing the oxidative process required for the conjugation of two molecules of diiodotyrosine to produce thyroxine. Since it is probable that in the normal gland these processes are enzymic in nature, the effect of the antithyroid substances may be anti-enzymic. Owing to the failure of the gland to elaborate thyroxine, there is a lack of the hormone in the body fluids and the animal becomes hypothyroid. In response to this condition the pituitary gland is stimulated to increase its thyrotrophic activity, and in turn the thyroid gland becomes hyperplastic through the increased secretion of thyrotrophic hormone. Nevertheless the hyperplasia of the thyroid gland is unable to relieve the hypothyroid condition, because of the blocking of the thyroxine-elaborating mechanism. If this interpretation is correct certain conclusions can be drawn. It is unlikely that the prevention of thyroxine synthesis is an all-or-nothing reaction; so a relation may be assumed between the dose of antithyroid substance and degree of hypothyroidism produced. It seems advisable, therefore, that in using the substance clinically to reduce hyperthyroidism close attention should be paid to dosage, with the aim of decreasing the synthesis of thyroxine to a normal level, but not below, so that there is no indirect effect in increasing thyroid hyperplasia. If some such balance cannot be achieved, then the question of the ultimate effect of the treatment on the thyroid gland may become very important. Moreover the possibility of non-thyroid effects of administration of thiourea must not be lost sight of, especially if the effect of the substance on the thyroid lies in preventing enzymic action.

While thiourea and related compounds appear to be of great potential importance as therapeutic agents, the effects of prolonged treatment will require careful study before the new technique can be accepted without qualification.

1. *Science*, 1943, 97, 156. 2. *J. Pharmacol.* 1943, 78, 79.

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STERNAL PUNCTURE IN THE TROPICS

Two papers elsewhere in this issue remind us that malaria is a disease not only of the peripheral blood but also of the internal organs. Any means of extending our methods of observation beyond the study of blood-films is therefore, on the face of things, likely to be a useful aid to diagnosis. Both papers record a significant number of cases in which malaria parasites were found in preparations from the sternal marrow when they had not been found in blood-films even on several examinations. It is on this point that previous work shows lack of agreement: some authors have praised sternal puncture in the diagnosis of malaria, but others have found it of little value. While it cannot be said that the difference of opinion has now been finally settled, the two new reports present a stronger case in favour of sternal puncture than any other reports have presented against it. Since sternal puncture is a simple procedure, involving, in skilled hands, little discomfort to the patient, there is no reason why it should not be used where necessary in the diagnosis of malaria just as it has been used in the investigation of other tropical diseases. It is safer than puncture of either liver or spleen.

When a person appears to be dangerously ill with malaria, it is obviously wrong to withhold treatment until parasites are found, whether in blood-films or marrow smears; there are clearly occasions when clinical judgment must be a sufficient basis for energetic action if life is to be saved. If the patient has already taken quinine, parasites may be very hard to find, and they tend to be scanty in first attacks, especially of subtertian malaria. Nevertheless it is probable that in the vast majority of acute cases of malaria search of thick and thin blood-films repeated at intervals of 4–6 hours will disclose parasites without too much difficulty. It is not true, as some suppose, that it is a waste of time to look for parasites "until the fever goes up again." They are often to be found in the apyrexial interval between paroxysms, and perhaps the best time of all for finding them is when the temperature has begun to fall. It is also worth remembering that gametocytes may be discovered in the blood about 8–11 days after the initial fever, even when earlier forms have not been demonstrable. From these considerations it seems likely that the main use of sternal puncture in malarial diagnosis will lie in the elucidation of pyrexias of obscure origin and those conditions of vague ill health with mental irritability which play an important part in tropical practice.

In examining films it is important to follow a rigid discipline about what is and what is not a malaria parasite. If there is doubt the report should be negative. But an open mind is advisable if what look like definite but unusual forms of plasmodium are found. The cycle of development of the malaria parasite in man is still incompletely understood. Between the bite of the mosquito and the appearance of trophozoites in the red cells some 10 days later a stage of development takes place which has not yet been seen. It has been guessed that, as in bird malaria, the parasite may undergo an exo-erythrocytic cycle of development in the reticulo-endothelial system; and if this is so, examination of the sternal marrow before and between attacks may conceivably yield results of more than ordinary interest. Any appearances indicating the presence of non-pigmented schizonts would be especially suggestive. But before attributing any findings to exo-erythrocytic malaria parasites it would of course be a wise precaution to show the films to an experienced malariologist.

The scope of sternal puncture in tropical medicine appears to be almost unlimited. Marrow biopsy has already proved valuable in the diagnosis of kala-azar, filariasis and trypanosomiasis; cultures of the marrow in enteric fevers and in pyogenic infections may yield positive results when the blood is sterile; and it is also reported that viable plague bacilli may be more readily recovered from the marrow of dead rats than from their blood, glands or organs. Nor should it be forgotten that marrow biopsy can often disclose the information necessary for a proper understanding of the various forms of tropical anæmia. It is clear, however, that much work is still needed to define the usefulness of the method, and we hope it will be taken in hand. The world-wide scope of the present war must have put the opportunity for such an investigation within the reach of many keen doctors. Equipment is simple and the main requirement is a plan of combined operations between those who have access to patients and those who can look at a stained film and tell the difference between an artefact and the real thing.

LABORATORY STUDIES OF BURNS

NOT the least benefit that war confers on medicine is that it often persuades scientists to turn aside from fundamental research and apply their knowledge and experience to matters of immediate practical importance. This has happened in the case of burns. As soon as the full German offensive started, on land and in the air, it was realised that burns would be one of the big problems of modern warfare. Surgeons may fairly claim credit for recognising quickly that the accepted methods of treatment were not only inadequate but also dangerous: they were being applied empirically under conditions far different from those of peace-time. The controversy that followed the first attacks on the use of tannic acid was in some ways unfortunate, but it had the merit of exposing our ignorance of the changes that accompany infliction of a burn. Even though there was general agreement on the scheme of systemic treatment this was largely based on the mistaken belief that the bulk of the fluid lost from the blood escapes from the surface of the burn.

The scientific study of burns in the laboratory led first to the devising of methods of producing standard lesions. One method was to dip the limb or part of the limb of an animal in water of known temperature for a given length of time.[1] An even more precise method is described by PETERS[2]: here a burning iron is used, and its temperature is accurately controlled by a continuous flow of hot water through the device. Experience with both methods shows that considerable damage to the tissues can be done at relatively low temperatures. LEACH, PETERS, and ROSSITER found that if the skin of an animal is burnt at 70° C. for one minute, the epidermis can then be

1. Glenn, W. W. L., Peterson, D. K. and Drinker, C. K. *Surgery*, 1942, **12**, 685.
2. Leach, E. H., Peters, R. A. and Rossiter, R. J. *Quart. J. exp. Physiol.* 1943, **32**, 67.

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lightly rubbed away to leave a moist surface comparable to the second-degree burn of man, and this type of burn was utilised in the study of the absorption of tannic acid by BARNES and ROSSITER.[3] Reports of the laboratory investigations also display interest in the existence of a burn toxin. PERLMANN and his associates [4] have shown by electrophoresis that a new protein appears in the serum of animals after they are burned. Because this protein is present in addition to, and not in place of, the other serum proteins, they suggest that it must come from the cells partially destroyed by the heat. From histological studies LEACH [5] concluded that there was evidence of two substances, one a nucleoprotein, leaving the cells in the zone of partial destruction below a burn. The nature of these substances remains unknown, but it is significant that their existence has been suggested by two independent lines of inquiry. Of equal interest is the fact that both groups of workers draw attention to this zone of partially destroyed cells at the edge of a burn. The study of what happens here may throw light on the reactions arising from these injuries.

The American workers have gone on to suggest a rational method of treating burns.[6] They found that a dog with two scalded feet might lose the equivalent of a third of its blood-volume into the area round the burns, although there was no external fluid loss. This leakage continues for many hours, and they think that small repeated transfusions of plasma might be more efficacious than a single large one. If the circulation is fully loaded the amount of fluid lost is correspondingly larger; and they even suggest that a continuous and excessive leakage may tend to lengthen the period of increased capillary permeability. In seeking to reduce loss of fluid under the burn, they studied the effects of enclosing a freshly burnt limb of a dog in plaster-of-paris. As BARNES and TRUETA [6] had earlier demonstrated, this decreases the flow of lymph and prevents œdema. The fact that this can be accomplished without embarrassing the local circulation was evident because the oxygen content of the venous blood leaving a burnt foot was the same whether the foot was in plaster or left free to swell. They went on to show that healing took place very satisfactorily under the plaster casts, and that there was much less scar tissue and contracture in feet thus treated than in others burnt similarly but allowed to swell; when swelling was permitted there was a mass of coagulated exudate around the burn which later became organised. Their proposal that enclosure in plaster-of-paris should be tried in the treatment of burns in human beings has been anticipated in this country by BARNES [7] whose clinical results confirm their experimental findings. The circulation was not embarrassed, nor did stiffness and contracture follow immobilisation. Here, however, we have another example of the caution needed in translating experiment into practice. The dogs were allowed to run about in their plasters on recovery from the anæsthetic, and showed no signs of discomfort, but in man when a plaster was applied to a limb, it was essential to raise the limb to prevent pain from swelling within the cast.

3. Barnes, J. M. and Rossiter, R. J. *Lancet*, 1943, ii, 218.
4. Perlmann, G. E., Glenn, W. W. L. and Kaufman, D. *J. clin. Invest.* 1943, 22, 627.
5. Glenn, W. W. L., Gilbert, H. H. and Drinker, C. K. *Ibid*, p. 609.
6. Barnes, J. M. and Trueta, J. *Lancet*, 1941, i, 623.
7. Barnes, J. M. *Brit. med. J.* 1943, i, 408.

It is to be hoped that more is yet to come from the laboratory that will point the way to improvements in the treatment of these difficult cases. Success and progress are most likely when treatment is controlled by an understanding of principles, and not by the mere mastery of details of technique.

Annotations

TRUETA ON WAR SURGERY

CREDIT for the closed plaster method has been laid at many doors. The Russians attribute it to Pirogoff, the French to Ollier, the Italians to Mettita, the Americans to Winnett Orr and the Spaniards to Trueta. Actually it has been slowly evolved through many centuries, but Trueta has been responsible for using it in its fully developed form in war. In his fine book [1] he points the way to the correct philosophical approach to war surgery. The young war surgeon, hacking at enormous wounds without much understanding, may come to look upon his work as carnage and in time forget the gentleness due to tissues which are in fact as delicate as flower petals. Trueta's theme is respect for the body's healing capacity. Methods of healing do not differ in war and peace, though our technique for assisting them may have to vary. His approach, however, is not that of blind faith; he continually analyses the healing process—for, as the President of the Royal College of Surgeons recently pointed out, the principles of how nature works don't have to be invented: they are there to be discovered. Trueta finds plaster the most convenient immobilising agent to obtain rest, but he insists that early surgery, excision and drainage are all necessary for success. His good early results were achieved before the days of local sulphonamides. He is just in his appraisal of the work of others, and pays high tribute to Winnett Orr's teaching that dressings should be seldom changed, drainage adequate, and the part immobilised; and especially to his warning to the surgeon "to watch the patient, not the wound." In an engaging chapter on the history of war surgery he reminds us of the English pioneers who have contributed to our understanding of the five cardinal principles: cleansing of the wound, Lister; the importance of rest, Hilton, Thomas, Robert Jones; drainage, Lister again, the first to use drainage tubing; excision of dead tissues, Milligan and Gray; prompt treatment, Florence Nightingale. In subsequent chapters Trueta uses this historical perspective to show how we arrived at modern views on wound healing. He has an ear for the telling phrase. He reminds us of the saying of Gamgee in 1853 that the degree of pressure required of a wound dressing is equal to "that with which one holds the hand of a lady when one greets her"; and of the dictum of Flemming in 1928 that "the best antiseptics are the natural defences of the body."

He describes the technique of excision of the wound explicitly. By many excision is still regarded as a sort of block dissection as if for cancer, perhaps done in the hope of removing all bacteria; others excise the track of the missile as though they were coring an apple. Trueta removes only what is dead or severely contused and begins by laying open the tissues so as to be able to see clearly and to differentiate the living from the dead. He gives precise technical details and insists that if the underlying principle is grasped "the quality of results is independent of the surgeon's manual skill." He advises the use of a fine-mesh dry gauze to pack the wound, because of its blotting-paper suction action into the plaster. This aspect of drainage has been rather overlooked in this war, the soft-paraffin pack being generally used. Winnett Orr said of the paraffin pack: "It is

1. Principles and Practice of War Surgery. J. Trueta, MD Barcelona, Hon. D SC OXFD. William Heinemann, with Hamish Hamilton. Pp. 391. 42s.

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not a wick to drain the wound nor a plug to fill it like a cork. The design of the surgeon should be to make a saucer-like opening of the entire area." Trueta uses this pack only for the heavily infected wound where pus forms so rapidly that any form of "blotting paper" dressing is soon soaked; the pack then provides an easy path for overflow drainage. He tells the story of Pirogoff in the Crimean war, who, finding himself short of splints, cut patterns from sailcloth, dipped them in plaster and fitted them to the limb. Trueta himself prefers plasters cut to pattern; and they certainly make it possible to apply shoulder spicas and spinal jackets quickly and easily. The smooth convalescence of wounds in plaster is now well known; as Trueta says, "pain or even discomfort in the wound is a sign that something is amiss."

HEART OF THE ATHLETE

THE Americans indulge in sport more intensively than we do over here, and it is only natural that American physicians should interest themselves in the effect of such intensive athletics on the health, and particularly the hearts, of their young men and women. In this country similar problems will be raised after the war by the development of civilian physical training, which is certain to receive a fillip when our attentions can once more be turned to it. Wilce,[1] a physician with considerable experience of athletics as both coach and doctor, has made a 13 years' study of the history and cardiac size of American male athletes, whose ages ranged from 16 to 80 years, but 90% of whom were between 16 and 49. Basing his findings on heart areas and diameters obtained by orthodiagrams, and using the Hodges-Eyster normal standards, he found that about half (113 out of 233) of his athletes had hearts that were absolutely enlarged. On strict criteria, which included history, and clinical and functional findings, only 37 of the 233 hearts could be classified as normal; of these normal hearts, 7 were considered to be enlarged as the result of athletics and, in Wilce's words, "would qualify as true athletic or work hearts, or normal hearts physiologically enlarged by exercise." Clinically and functionally these hearts were normal, their owners being active athletes, and Wilce sees no reason why such athletes should not continue playing games, though he has to admit that the eventual outcome of such enlargement is not yet known. In two cases such enlargement was actually seen to develop. One was a high-school basket-ball star, whose heart over a period of three years gradually increased in size, though it never became absolutely enlarged; he is still a star player. The other was an Olympic champion sprinter, whose heart, under especially strenuous training conditions, was found to change in area and contour, developing left axis-deviation in the electrocardiogram; two years after discontinuing Olympic training the heart showed slight increase in size.

A closely allied difficulty arises when a man with an organically damaged heart is yet able to indulge in hard physical exercise, the cardiac lesion being only found accidentally on routine examination. Wilce refers to a college freshman with chronic rheumatic heart disease and a cardiac area enlarged by 65%, who was able to take part efficiently in all high-school sports and freshman's football. Another of his cases was a schoolboy, a keen basket-ball player, who was found to have a damaged heart and refused to accept the advice given to him to cease playing games; three months later his cardiac area was found to have increased from 13% to 31% above normal.

Our knowledge of the effects of repeated violent exercise is still meagre and empirical, and the normal limits of cardiac area, as measured by the orthodiagram, are so wide that isolated observations are of little value. Wilce's findings suggest that they are even wider than has been supposed. On the other hand, serial measurements are undoubtedly of value in deciding whether cardiac enlargement has occurred, and such measurements, carried out over a long period, would provide much information as to whether slight cardiac enlargement does follow indulgence in athletics and if so whether it has any deleterious effect on the function of the heart in later years. This knowledge would help in deciding how much exercise the child or adolescent can safely undertake. The youngster with an organically damaged heart must obviously be considerably restricted in his exertions, though care must be taken to maintain a balance between protecting the heart and limiting its owner's activities unnecessarily. How many boys have had their schooldays ruined by a doctor's verdict that they have a "strained heart" and must therefore not play games! The obvious aim is to allow the maximum liberty compatible with the functional state of his heart, and the benefit of the doubt should be in favour of more exercise.

Finally there is the unsolved problem of the effect of infections, such as influenza, on the heart. Must exercise be restricted during convalescence? The answer seems to be "yes," which places considerable responsibility on the medical officer with adolescents under his care. Clinicians, in conjunction with physiologists and pathologists, should give this urgent question the attention it deserves. The war-time experience of the Service medical departments should provide a mass of data on which to base further investigations.

1. Wilce, J. W. *Amer. Heart J.* 1943, **25**, 613.

CONTRACEPTION IN A RURAL AREA

ONE of the prewar "problem" areas of the USA was the Southern Appalachians, a region of some 110,000 square miles, overlapping nine States but lying mainly in Virginia, West Virginia, Kentucky and Tennessee, and devoted chiefly to mining and farming. The chronic depression of the former occupation and the low productivity of the latter, coupled with the highest fertility-rate in the United States, has led inevitably to a picture of acute poverty. Family limitation, as Beebe points out in a recently published study,[1] cannot bring economic and social salvation to such a region but it may at least be one means of alleviating the pressure upon the standards of living. To test the possibilities in such a rural community, a county was chosen and a service inaugurated with a public health nurse to instruct married women applicants in the use of a vaginal jelly, to keep them supplied free of charge and to secure reproductive histories before and after the contraceptive efforts. In all some 1300 women availed themselves of the service during the years 1936–38 and were followed up for an average period of 21 months. The normal high fertility-rate of the area is hardly surprising since the previous histories show that over 80% of the women had been married before they were 20 years of age, the average reported frequency of coitus was twice a week, and methods of contraception though used on an increasing scale by the younger members of the population were certainly not widespread and of somewhat indifferent efficiency. In the period of observation following the introduction of the service 658 conceptions took place, whereas 1145 would have been expected if the previous pregnancy rates at different intervals of the marriage had continued to prevail; in other words on this basis some 40% of the expected conceptions had been prevented. Though quite substantial it may well be doubted whether success of this order over a relatively short period of time is sufficient to induce women to continue with a particular method over a long period. Indeed in this study only a third of the women were still using the prescribed method after

1. Contraception and Fertility in the Southern Appalachians. G. W. Beebe, PH.D. (Baillière. Pp. 274. 14s.)

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2 years. This is hardly surprising since the vaginal jelly proved to be little, if any, more effective than methods already known to the patients and the only reason for its relative success was that more women practised contraception more of the time. On the other hand, as Beebe's figures show, one effect of the service is to increase generally the interest in family limitation so that more contraceptive precautions of all kinds ensue and not only the prescribed method; such interest may be more lasting. To be at all effective, however, in such an area he concludes that any contraceptive service must include a regular follow-up and the provision of more than one method to overcome the heavy loss of patients dissatisfied with the initial prescription. The present population outlook suggests that we may shortly be much more concerned in promoting the birth-rate than in depressing it; but at a time when it is still necessary to adjust fertility to economic conditions rather than the reverse, this account of the success that may attend efforts in a rural community is relevant, and adds something to our knowledge of reproduction in the absence of contraception.

NURSING TUBERCLE

King Edward's Hospital Fund for London has made some practical suggestions[1] for the prevention of tuberculosis among nursing staff in general hospitals. There is nothing revolutionary about them: they are plain common-sense. But it would be a great advance in current practice if they were universally applied. The memo points out that the nurse in a general hospital is not so well safeguarded against tuberculosis infection as are nurses working in sanatoriums. There is proper equipment for sterilising sputum mugs, china and handkerchiefs in a sanatorium, and the nurse does much of her work in the open air. In general hospitals it is often the duty of a new and untrained student nurse to deal with sputum mugs; and handkerchiefs are sometimes allowed to accumulate in a patient's locker until his relatives come for them. A sink may be contaminated if china from infectious cases is washed there, even though it is kept separate from other china. The memo suggests that in the preliminary training school and throughout their hospital training all nurses should be taught by sister-tutors and ward sisters the precautions necessary in the nursing of tuberculous patients, and the way in which infection in respiratory conditions is spread. Nurses should learn how the patient can avoid distributing droplet infection; she should realise that the hands of those nursing positive cases must be washed often, and that no books or papers belonging to such patients should be lent to others in the ward. She should remove the overall or apron she wears in the ward before she goes to meals. She should be encouraged to report at once any cough or other mild respiratory symptom which she notices in herself, and especially any persistent feeling of fatigue. All nurses under 30 nursing tuberculous cases should be examined by X rays at three-monthly intervals. Every patient in the wards who is coughing up sputum should be nursed "on precautions," if possible in a side ward, until tubercle is excluded. Wherever possible a boiler should be installed so that all sputum mugs can be sterilised before they are cleaned. The hospital should provide the patients with handkerchiefs and should have special arrangements for laundering them. A third- or fourth-year nurse should be responsible for collecting them daily in a pail containing disinfectant. Pillowslips and sheets should also be collected and sterilised with proper precautions, and methods of sweeping and dusting round beds should be such as to avoid dissemination of infection in dust. If there is no steriliser for china, the crockery used by infectious cases should be washed in a separate sink.

Perhaps the most important single item in these sensible rules is that requiring a nurse to report early with slight symptoms; and here some matrons and ward sisters need education. At present it is only too common for a nurse to hide symptoms which appear trifling because she fears—and with justice—the reproaches of a short-staffed and short-tempered senior. But the attack of tubercle is often insidious, and in dealing with it over-caution is praiseworthy and heroism always misplaced.

1. Memo on the Supervision of Nurses' Health (Geo. Barber & Son, Furnival Street, London, E.C.4. 3d.) drawn up by a committee under the chairmanship of Sir Charlton Briscoe, on which were co-opted three nursing matrons, Miss R. Darbyshire (BRCS), Miss H. Dey (Bart's) and Miss E. E. P. MacManus (Guy's).

SOVIET MEDICINE IN THE FIELD

A FILM of the Red Army Medical Services shown at the Royal College of Surgeons on Oct. 8 illustrates the care of wounded from their rescue by sledge to their re-training for battle. Though it was made two years ago and introduces nothing very novel in surgical technique, it shows how some of the medical problems of winter warfare have been overcome on the Eastern Front, and it has pleasant splashes of local colour. As in peace-time Russia, doctors and their auxiliaries seem to be lavishly supplied with white raiment; the Russian hospital ward tends to be less formal and more homely than ours; and we see an official artist making a portrait of a hero as he lies in bed. Particularly striking are the scenes where casualties reaching the base are made clean again with hair-cuts, baths and showers; and later there are instructive pictures of men undergoing rehabilitation, including devices for restoring precision of movement.

The film was introduced by Prof. Semon Sarkisov, who said that the good offices of Madame Maisky had made it available to the Anglo-Soviet Medical Council. The English version of the commentary, by Dr. K. W. C. Sinclair-Loutit, was spoken by Mr. Wilfred Pickles. Sir Alfred Webb-Johnson, president of the college, expressed the thanks of the gathering for what they had received.

THE first tribunal to hear appeals against pensions awards under the 1943 Act will sit on Oct. 18 at the Royal Courts of Justice. The panel of medical men from which the tribunals will be drawn consists at present of R. G. Blair, MB; R. M. Dannatt, FRCS; Lieut.-Colonel P C. T. Davy, CMJ, MB; Colonel C. M. Drew, DSO, MB; Colonel J. Heatly-Spencer, CBE, FRCP; Vincent Norman, MD; B. H. Pain, MB; Major-General Sir Cuthbert Sprawson, CIE, FRCP; A. R. Thompson, FRCS; and J. F. Venables, DM. Further appointments will be announced by the Lord Chancellor from time to time.

Surgeon Rear-Admiral Sir THOMAS DESMOND GIMLETTE, who died at Epsom on Oct. 4, at the age of 85, was inspector-general in charge of the Royal Naval Hospital, Haslar, from 1908 to 1911 when he was created KCB. Retiring shortly before the last war, he returned to the Service in 1914 to take charge of the Admiralty Recruiting Headquarters.

Dr. RALSTON PATERSON is on his way to Sydney, having received an invitation from the Premier of New South Wales to advise on the organisation and equipment of a Cancer Institute there. The institute which is to be built in Sydney will serve the whole of the state. Dr. Edith Paterson, who accompanies her husband, will be engaged on the research and propaganda aspects of the problem. They expect to be away from England for four months or so.

MEDICAL SOCIETY OF LONDON.—On Monday, Oct. 18, at 5 PM, Prof. G. Grey Turner will deliver his presidential address at 11, Chandos Street, W.1. His subject is to be transplantation of the ureter.

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Special Articles

CONDITIONS NECESSARY FOR CONSULTANT WORK

(FROM A CORRESPONDENT)

THE conditions under which a consultant can do his work best may be considered, on the broadest level, as embodying the same principles as apply to the members of any large profession or occupation, working within a partially planned democratic political and economic system; or, in more detailed terms, they can be considered to show the problem of a specialised group of doctors working in a more organised way than formerly for the same public and the same employers broadly as before the war. As the latter view involves a mass of detail which must depend in large measure on acceptance of certain general principles, I propose here only to suggest some principles which can be used as a guide in the difficult, and essential, business of exact planning.

The consultant must conduct his work so that he has (1) satisfactory incentives; (2) satisfactory freedom from handicaps; and (3) satisfactory checks and stimuli.

INCENTIVES

The incentives would offer him certain prized advantages to be got from doing his work as well as he possibly can. It would be false in such a profession as medicine to rate remuneration first, or very high, among incentives. Salaries must, however, be adequate to meet the appropriate standards of a professional worker with good qualifications, and should be such as most consultants would recognise to be fair and commensurate with the duties of the post. More important incentives will be :—

(*a*) The *interest* of one's clinical work and devotion to it, which can only be achieved if there is an adequate range of clinical material, adequate freedom in dealing with it and adequate opportunities for progress and individual initiative.

(*b*) *Status and reputation.*—Able men must have opportunities for obtaining appropriate recognition of good work they have done, and opportunities for just promotion, which may be as much, or more, a matter of raised status than of raised pay.

FREEDOM

Freedom from handicaps will ensure that the consultant has freedom of action in all professional activities (e.g. freedom of access to patients, freedom of professional conduct and association). He must not be subject to interference by unqualified persons in the performance of his medical duties. He must not be dependent on the goodwill and countenance of an individual, nor liable to be retarded or advanced because of opinions formed about him at second hand (e.g. by a non-medical employing body acting on the advice of a medical official). He must be able to express opinions on medical matters even if they are inacceptable to his superiors, and he must not be constrained to make all his approaches to those controlling his conditions of work, through a single, narrow, "official channel," (e.g. an administrative officer or superintendent). In fixing terms of service and other conditions of employment—including hospital arrangements—which are medical or have plain medical consequences, the consultants shall have a voice, and the subsequent right of appeal. Where, for example, it is agreed that the employing authority may properly require a consultant to work in one place for a long period, or to move to another area, there must be safeguards against unreasonable or arbitrary action by the authority, and the consultant should have a recognised court of appeal in disputed cases.

It must be recognised that whatever comprehensive system is adopted there are sure to be handicaps and demerits of many kinds which will only become apparent when the system is working, just as we have come to know the serious defects in control of health services by local authorities under what probably appeared to those who drew it up an admirable scheme. Clearly therefore maximum care must be taken to avoid the known defects of the existing systems under which consultants are employed, and to attempt to foresee the defects which are implicit in either the new systems proposed or in the remedies instituted as amendments of the old system. Also as in all planning, it will have to be recognised that in the beginning there are bound to be not only achievements but also errors and mistakes, and that the method is one of trial and error in regard to all but the broadest issues. Consequently the system must not be a rigid one, nor installed as if in perpetuity, but must allow explicitly for constant modification in the light of experience: machinery to this end is an essential part of any such plan.

STIMULI AND CHECKS

Stimuli and checks must chiefly aim to preserve the direct relationship between doctor and patient, and to ensure that the consultant does not fall into the errors of outlook and practice which beset any professional group (or indeed any occupational group) left to its own devices, without the advantage of public guidance and effective scrutiny. The evil effects of a corporation or guild structure for professional groups, as in the Italian Fascist state, are sufficiently well known.

Hitherto wide freedom of choice of doctor by those who can pay has acted (among its other good functions) as a rough and ready means of penalising the consultant who does not satisfy the public's legitimate needs. But it will probably be less operative in the future, and though consultants will no doubt continue to have very high standards of professional duty they will be deprived of this steady check on the development of an arrogant caste attitude—"give the public what is good for them, whether they like it or not"—an attitude which, sometimes masked by concomitant propaganda, seems to develop in any self-sufficient and wholly autonomous occupational group (the "technocrat's" point of view).

Some better means must therefore be devised for keeping the consultant and the public closely in touch than has hitherto existed, for example, between the outpatient clientele and the consultant staff of voluntary hospitals (where an inarticulate public opinion often had no means of bringing about a better standard of amenities approximate to those of private consultant practice). Similarly, the population of many boroughs and counties failed to demand and obtain, through their representatives on the municipal or county authority, necessary improvements in the hospitals conducted by the local authority; neither the doctors nor the patients could in fact obtain the conditions which both more or less wanted. There must then be a close link between medical services and those for whom they are provided. It might be said, indeed, that close supervision and active criticism by the public is a necessary feature of good consultant medical services, just as it is, say, of good transport services.

Even more necessary, on the other hand, is mutual confidence between doctors and patients; this will be all the more essential when the freedom of choice of consultant may be further restricted in some areas. There must therefore be adequate administrative machinery to ensure that those among the public who urge any change in the consultant services provided shall feel that their suggestions and criticisms are weighed as fairly as possible and if approved will be adopted. Equally there must be machinery to ensure that consultants are not hampered, nor their time frittered away in rebutting frivolous or irresponsible criticism and trying out ill-advised suggestions. There must therefore be :—

(*a*) Good *health education* bringing about, among other things, a good relationship between consultants and the public; and of course there must be a good relationship, and a smoothly working code of conduct, between consultants and other doctors or workers in the health services.

(*b*) Good *arbiters* and *intermediaries*—a mixed body of doctors and laymen for example, before whom local problems in the health services can be thrashed out and ventilated. Of course local conditions will determine to what extent all this can be brought about in a particular area; there will be very great divergencies and what would be a thoroughly good arrangement in one region would be as bad as could be in another. The general pattern might be that advocated by Sidney and Beatrice Webb in their very pertinent chapter on the "Reorganisation of the Vocational World."

CONCLUSION

I recognise that generalities of this sort are alone of little use in deciding how good consultant services may be ensured, but unless general principles are first agreed

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on, I think the discussion is in danger of getting bogged in detail, or of taking the sterile, negative line of pointing out all the objections to any national scheme that has been proposed, particularly if the scheme contemplates local authorities as the employing bodies responsible for adapting centrally determined policy to local conditions. I believe a detailed scheme could be drawn up based on the foregoing principles.

I have not dealt at all with the broad administrative questions which are often the chief subject of discussion in regard to health services—e.g., the desirability of keeping separate the four functions: (*a*) drawing up, by experts, of the scheme of organisation, (*b*) adoption of the scheme by the competent authority, (*c*) execution of the scheme, (*d*) supervision of its working; the degree of control to be exercised by local authorities; the constitution and powers of technical advisory boards such as the Central Medical Board. One great objection, however, must be faced. Any organised system of consultant services (which will no doubt depart from the prewar pattern) will mean a restriction of the consultant's freedom, whatever safeguards are insisted on. The question is whether this restriction of his freedom is in the long run advantageous to the national health, for the sake of which it is imposed, and whether he is prepared to make the sacrifice on this and other grounds of public or private benefit.

For the consultant, as for the other people concerned in any genuinely national medical service, the issues will not be clear unless some distinction is drawn between the different varieties of apparently free choice; between "unwanted and wanted choices, formal and real choices, the choices left to the few and those left to the many, and finally between essential and unessential choices."

PALESTINE

TYPHUS CONTROL

THERE have been 23 deaths from a typhus outbreak during the past 8 months in Palestine. The epidemic affected chiefly the southern districts, and the Department of Health has prepared special delousing units and portable showers for use if it is necessary to cope with further cases. The infection is thought to have been imported from neighbouring countries, especially Egypt. High wages in Palestine have attracted Egyptian labour, not all of it legally admitted. Murine typhus carried by rats is endemic in Palestine, but this epidemic was caused by louse-borne typhus, which is more serious and had not been seen in Palestine since the end of the last war. A vaccine from the Health Department was used with good effect, and a special laboratory for research into and control of typhus has been opened by the Jewish University and the Hadassah Hospital at Jerusalem. Professor Kligler, head of the department of bacteriology and hygiene, has been put in charge of it.

HOSPITAL DEVELOPMENT

The Yarkon Hospital at Tel-Aviv may be taken over shortly as a government hospital to serve rural areas. At present it is a municipal hospital, serving as an annexe to the congested city hospital. The number of beds may be raised to 80–100. The shortage of beds in the Tel-Aviv municipal general hospital is so severe that Dr. T. Gruschka, the director, has resigned. He found the responsibility too great of selecting patients for the two or three vacancies daily from a group of 20 or 30 applicants. The shortage of hospital accommodation is acute in Palestine, and it is pleasant to read that two Moslem ladies have presented £30,000 for the construction of a hospital in Gaza to receive those who are in need.

SLUM CLEARANCE

Mr. Henry Kendall, town planning adviser to the Palestinian Government, proposes that improvement trusts for slum clearance should be set up in all the large towns. Similar trusts have done good work in Bombay, Madras and Singapore. Funds are provided either by the Government and local authorities or by means of loans. The town-planning order of 1936 is now outdated and needs amending.

CITRUS LEATHER

The Agricultural Experimental Station in Rechoboth, near Tel-Aviv, has made a preparation of dried oranges to which the name citrus leather has been given. Samples, intended mainly for the manufacture of marmalade, have been sent to England for tests. The vitamin content and the flavour of the fruit are preserved, and even after the war citrus leather should make it possible to spread the marmalade-making season over the whole year instead of concentrating it into a few months to correspond with the ripening of the fruit. For the moment it should mean a great saving in shipping space and in expense. Research on this problem has been carried on at the station for two years, and has been supported by the Citrus Marketing Board. If results are satisfactory a commission from the Ministry of Food, to study methods of dehydration in the Middle East, is expected.

In England Now

A Running Commentary by Peripatetic Correspondents

EVEN Mr. Churchill gives us hope that by 1945 or 1946 we may be within sight of the turning-point. But the Ministry of Labour and National Service, judging by Form FG. 11, is expecting a long war. "The physical requirements for a member of a stirrup pump team," it says, "are regarded as—fair sight (with glasses, if worn) and hearing, ability to work a stirrup pump, to carry a bucket of water for 25 years on level ground and to climb two flights of stairs at a reasonable pace without distress." Those who kick the bucket will be disqualified.

* * *

Why the psychologists decided to become the psychiatrists is known only to themselves; the step was rash, for both the meaning and the pronunciation of "psychiatrist" present difficulties. Classical scholars among the apostles of scientific medicine are scarce, but an erudite major—most Army psychiatrists are majors—was able to put his finger on the Greek word *ἰατρός*, meaning a healer, as the key to derivation. And then the pronunciation: *psychi*atrist, the *mind* healer; psych*iat*rist, the mind *healer*; or psy*chi*atrist, the mind-healer? Following the Greek practice of throwing the accent on the last syllable but two they adopted the last though the syllable accentuated is only a connecting link in a compound word. From those who did not worry themselves with painstaking investigations the word invited the anglicism "trick cyclist," and got it.

Well, why not? In ancient Thessaly, the land of horse-breeders, they used to maintain a public veterinarian, agreeably known as the hippiatros. I rather favour the ending "tros." A hippiatros, for me, calls up a cunning union of horse and man and albatross—a centaur with wings, a Pegasus among vets. Might not a psychiatros fly equally high? But no: the rôle of winged soul-healer might tell in time, even on the super-ego of a trick cyclist. And few of them would look their best in the kit.

By a natural transition one begins to wonder why other branches of the profession have not labelled themselves as healers. Are they too modest? Do they only *know* about their special diseases, making no claim to mend them? The only others who openly promise a cure are the pædiatrists. If the profession is to be homogeneous in nomenclature, as in so many other directions envisaged by the planners, all branches should fall into line. We must prepare to accept the gynæciatrist (or tros), the ophthalmiatros (or trist), and even the oto-rhino-laryngiatrost, who is enough of a hybrid already to stand another cross.

Anyhow, these long complicated words are multiplying too fast. Shall we ruthlessly apply the pruning knife of elision, and produce such pleasant and easy words as psychist, otist and laryngist? Or must we go on mumbling compound words until the trick cyclists in their old age have to pedal their tricycles to a shop where the tricyclologist diagnoses the trouble and the tricycliatrist effects the repair?

* * *

I had a beastly dream last night. I dreamt that I was a peripatetic correspondent, and in the course of my wanderings had happened to spend a night in a Wessex farmhouse. At the gate stood two highly-polished churns awaiting despatch to a well-known firm whose philanthropic outlook may be summed up in the phrase:

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"Pure Pasteurisation for Pale People." So I thought I'd take a look through the other end of the milk bottle and see how this invigorating beverage first saw the light of day.

The farmyard was one of those quaint old farmyards—entirely unpaved with a midden-heap at the far end, needless to say the end nearest the cow-shed. There was plenty of mud everywhere; where there was no mud there was a neat heap of cow-dung, and there were numerous deep puddles which even the recent heavy rains could not rid of their stale urinous smell. The cow-shed was also quaint and old, very old, with an occasional gap in its wooden walls where a plank had finally given up all attempt at keeping out the elements and had rotted away. The inside of these walls was a dull grey, giving the impression that they had received a coating of whitewash at one time, but that the decorator had long since had to retire in face of the overwhelming onslaught of the droppings and splashings of his bovine charges. A nearby stream provided an excellent water-supply, the only criticism here being that the water was pumped from an intake situated about ten yards downstream from where the cattle waded, drank and performed other natural functions. Incidentally, this water was used in the cooler—Oh, yes; the milk was cooled—and the overflow from the cooler was allowed to run into the empty churns returned by the People's Pasteurising Co., "to give them a good rinse out, and to make sure that they were clean." I also noticed several milk bottles being washed out with water from the aforementioned stream, and I was informed that these bottles were used for the "pure" milk that was sent up to the village school every day—"It is only right that the children should have fresh milk. I reckon this 'ere pasteurisation takes all the goodness out." The cardboard caps of these bottles were kept in an old cigar-box (lidless), and were put on by hand. Milking was by hand, no pipes or other complicated apparatus to get dirty (or keep clean), and a good milker the dairyman proved to be. I don't know that I quite approved of his filthy old coat or his ragged cap, worn to keep his head from being dirtied by the cow's flank, which appeared never to have been washed; nor, for that matter, had any other part of her hind-quarters. The use of an open bucket seemed hardly in keeping with what I had been taught as a student of public health, but I did see the bucket being scrubbed afterwards in the scullery with soap, a rather bald scrubbing-brush and well-water in a chipped and rusty once-enamelled bowl. Two snatches of conversation are worth placing on record. "Go and get us a drop of milk, my dear. Use this saucepan, not those bottles. I know the saucepan is clean, I washed it myself." "My husband misses the lard I used to give him. He always found it so good for the sores on the cows' udders."

It *was* a beastly dream.

* * *

Here are some lines on Planners I found the other day in Wordsworth's *Prelude*:

> These mighty workmen of our later age
> Who, with a broad highway, have overbridged
> The froward chaos of futurity,
> Tamed to their bidding . . .
> . . . . . the keepers of our time,
> The guides and wardens of our faculties,
> Sages who in their prescience would control
> All accidents, and to the very road
> Which they have fashioned would confine us down,
> Like engines; when will their presumption learn,
> That in the unreasoning progress of the world
> A wiser spirit is at work for us,
> A better eye than theirs, most prodigal
> Of blessings, and most studious of our good,
> Even in what seem our most unfruitful hours?

* * *

Is there any foundation for the belief that doctors tend to die of the diseases in which they specialise? Up to a point there is obvious reason for such an association. The victim of tubercle is naturally drawn towards sanatorium work, so the odds of an ultimate defeat by the bacillus are considerable. The sufferer from almost any disability has his interest stimulated by the strongest of all motives and so acquires a special knowledge which he profitably employs in his professional life. Cardiac lesions are common enough, so that the occasional occurrence in a cardiologist is merely within the laws of averages. And if you are a general practitioner something in your line must turn up sooner or later. Yet queer things do happen—when, for example, a neurosurgeon succumbs to a brain tumour. I once enjoyed a most persuasive discourse from a philosophic colleague who was convinced of this relationship on psychosomatic grounds, especially in regard to coronary infarction. I had to suggest that the practice of gynæcology would, according to him, be the best way to ensure immortality or at least comparative immunity from the dangers of specialisation.

Public Health

Fevers in Dublin

Dr. C. J. McSweeney, in his report for 1942 of the Cork Street Hospital, records a fatality-rate for diphtheria of 5·51%—the lowest since *gravis* strains appeared in Dublin. He is inclined to attribute this less to immunisation than to a shift in incidence (noticed also in England) to the older age-groups. Among 581 confirmed diphtheria admissions a surprisingly high number (133) gave a history of immunisation three months or more previously, but it should be noted that 35% or more of the children immunised in Dublin are estimated to have received only a single dose of alum-precipitated toxoid. Of streptococcal diseases scarlet fever had its customary mortality of less than 1% and for the fourth year in succession no patient died in the hospital from erysipelas—a result largely due to sulphonamide therapy. There were 8 deaths among 34 cases of meningococcal meningitis, but four occurred within 15 hours of admission before specific treatment could have any reasonable chance of success. The high mortality (20·4%) for whooping-cough suggests that only complicated cases were admitted; bronchopneumonia was present in some 60% of cases treated. An outbreak of poliomyelitis in the autumn produced 15 cases of the bulbar type, all fatal. In contrast there was only one death among 44 spinal cases, with some residual paralysis in 6. Treatment of respiratory paralysis in 18 cases by a Bragg-Paul apparatus led to 4 recoveries, presumably in the spinal type of disease. Bulbar respiratory paralysis—whether arising in polio, or (less commonly) in diphtheria—is rarely amenable to mechanical aids. Gastro-enteritis appeared among young children in epidemic form for the second year in succession, with a general death-rate of 43·1% (40·7% in 1941). Of 75 deaths 73 were in the first year of life; nearly 90% of the infants admitted were bottle fed. Sulphaguanidine was given to 72 unselected cases without appearing to influence the course of the disease—a result supported in the main by controlled investigations elsewhere.

Manchester considers Health Centres

The city council of Manchester has unanimously approved a report on health centres presented by Dr. C. Metcalfe Brown, the medical officer of health. In it he sets out the present position in the city: there are 22 maternity and child welfare clinics, many of them housed in drab, unsuitable and even relatively dirty quarters with inadequate or primitive sanitary arrangements. There are also 10 general school clinics, each with a dental section, one special, one dental, one child guidance and one orthopædic clinic; these, in Manchester, come under the education authority. The report suggests that the city's needs would be met by one main health centre, and four subsidiary centres for every 50,000 people; on this basis 15 main and 60 subsidiary centres will be required. The report offers detailed suggestions for a main centre, including plans, the feeling being that such main centres should be built first. The type of centre contemplated is purely for municipal services, and does not provide consulting-rooms for general practitioners: the report suggests that if general-practitioner health centres are to be set up they should be linked with the municipal centres to ensure efficiency with economy.

It is not possible to choose sites for centres, because these will depend on the town planning scheme, now being

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prepared. The design of the municipal health centre is generous, with a lofty entrance hall reached through a forecourt with playing space for children. Corridors radiate from the entrance to all ground-floor departments, and lifts serve the two upper floors. On the ground floor there would be a maternity and child welfare section embodying antenatal and postnatal clinics, a milk sales room and a dispensary. Three wings branching from the main front would house the school medical services, a venereal disease clinic, a day nursery for 40 children, and an isolation unit offering temporary accommodation for patients found to be suffering from infectious disease. An accident unit for the treatment of minor household and street accidents, and a lecture theatre complete the ground floor. On the first floor there would be dental and X-ray units, a skin department, an orthopædic section, and department for massage and light treatment, a pathological laboratory, staff dining rooms, and kitchens which would supply both staff and day nursery. The second floor would contain offices for the senior medical officer, health visitors, midwives, clerical staff, medical records and library. Dr. Brown makes it clear that these are merely suggestions, open to amendment as events change, and serving as a basis for discussion.

In submitting the report Dr. F. E. Tylecote remarked that it was the public health committee's first instalment of reconstruction. Others were to come.

The Second Quarter

The birth-rate in England and Wales during the second quarter of this year (17·5 per 1000) was higher than in any similar quarter since 1926, but the marriage-rate fell to 15·9, the lowest since the second quarter of 1937. The death-rate, based on the mid-1939 population, was 11·0 per 1000, compared with an average of 12·00 for the same quarters during the quinquennium preceding 1942. Infant mortality, at 46 per 1000 live births, was the lowest ever recorded for this period of the year. In recording these facts in his Quarterly Return, the Registrar-General recalls that during the last war the birth-rate fell continuously, from 24·5 in the second quarter of 1914 to 18·2 in the second quarter of 1918.

Infectious Disease in England and Wales

WEEK ENDED OCT. 2

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 2956; whooping-cough, 1583; diphtheria, 724; paratyphoid, 7; typhoid, 7; measles (excluding rubella), 465; pneumonia (primary or influenzal), 409; puerperal pyrexia, 143; cerebrospinal fever, 30; poliomyelitis, 13; polio-encephalitis, 3; encephalitis lethargica, 3; dysentery, 337; ophthalmia neonatorum, 80. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Sept. 29 was 1878. During the previous week the following cases were admitted: scarlet fever, 246; diphtheria, 35; measles, 9; whooping-cough, 39.

Deaths.—In 126 great towns there were no deaths from measles, scarlet fever or enteric fever, 10 (1) from whooping-cough, 10 (1) from diphtheria, 69 (10) from diarrhœa and enteritis under two years, and 12 (1) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 205 (corresponding to a rate of 31 per thousand total births), including 24 in London.

A GRANDSON AT GREAT ORMOND STREET.—Dr. Andrew Barlow has been appointed house-surgeon at the Hospital for Sick Children, Great Ormond Street, where his grandfather, Sir Thomas Barlow, FRS, was registrar before joining the honorary staff in 1875. Sir Thomas celebrated his 98th birthday on Sept. 4.

SOCIALIST MEDICAL ASSOCIATION.—Dr. Horace Joules is to take the chair at the SMA conference on a national service for health which is to be held on Sunday, Oct. 17, at 3 PM, at the Conway Hall, Red Lion Square, London, W.C.1. The speakers are to be Mr. Hector McNeil, MP, and Mr. Somerville Hastings.

Letters to the Editor

CONTRACTING OUT

SIR,—The Representative Body of the BMA paid little attention to one of the most important and debatable questions which will engage the attention of the profession when the white-paper comes before us.

The question of "contracting out" was first raised at the Annual Representative Meeting of 1942, when by a very narrow majority the representatives decided that the Government should provide a comprehensive medical service available to the whole community. To this, as a sort of afterthought, was added a rider to the effect that any patient, though entitled to treatment under the scheme as a statutory right without direct charge, should be at liberty to obtain his medical attention privately, without reference to the national scheme, on direct payment of fees to the doctor concerned. The doctor would be entitled to retain such fees, which would be an addition to his basic remuneration in the National Service. The little discussion that followed did not appear to make any very deep impression on the meeting, and the rider was passed without much, if any, opposition. Its implications have, perhaps, been insufficiently realised.

The main arguments of its protagonists seem to be that if a state service were set up there would be a large number of what are now private patients who would resent being included, nolens volens; and that many of this class of patients would prefer to employ their doctor in a private capacity much as they do at present, paying for his services as rendered, although they would be entitled to his services under the national scheme without direct payment. At first sight this seems reasonable, and in accordance with democratic principles; but there are snags. Let us consider the matter from the standpoint of patients.

Jones has an income of say £500–600 per annum, and a family including children of school age. To such a patient, a long illness or a surgical operation is a nightmare, as the expenses involved would have a disastrous effect on his budget, unless, of course, he makes use of some form of contributory scheme. He is, therefore, delighted with a state health insurance scheme, which relieves him of all anxiety in return for a regular contribution which he can afford. The state assures him that he is now provided with the most complete and efficient medical service that money can buy, and puts, in addition, all forms of specialist and ancillary treatment at his disposal.

By devious means, however, he learns that his employer, although he is as much entitled to participation in the scheme as Jones is himself, and has paid his social security contribution, has decided to consult his doctor in a private capacity. It may very well be the same doctor who attends Jones and his family.

What will Jones think? Logic must lead him to conclude that his employer would not pay for something to which he is already entitled unless he is getting something for his money. From here it is a short step to suppose that the "complete medical service" cannot really be complete, or there would be nothing for which his employer need or could pay extra. It matters not whether he is employing the doctor he has chosen under the national scheme or one working outside it. If the former, it will appear to Jones that Dr. X dispenses two classes of medicine, one to those who pay him and the other to those who do not—however untrue in actual fact this may be. Or, if the latter, it will suggest to him two classes of doctor, those employed by the state and those working independently, who, judging from the preference of his employer, have a little something the others haven't got.

In any event, it seems inevitable that a distinction will be drawn between "state" medicine and "private" medicine, or between "state" doctor and "private" doctor—in each case to the eventual detriment of the first named.

Now let us consider the case of another patient.

Smith is somewhat better off than Jones, and maybe he is also a bit of a snob. At all events he elects to contract out of the national scheme. All goes well till he has a long and expensive illness. In due course, as he sees the shadow of his doctor's bill lengthening on the ceiling above his bed, he remembers that the extensive medical attention he is receiving is after all his by right, and that he need not really

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be paying for it at all. He therefore decides that he will stop contracting out the next day—thus giving rise to a certain amount of confusion in his doctor's record-keeping, and perhaps not a little ill-feeling. Here, then, the door is open to abuse, for there are bound to be a certain number of Smiths in the world who will contract out while they are well and very quickly contract in again as soon as there is the prospect of a long illness.

It is not inapposite to compare the proposed National Health Service with the present educational system. Here again the state provides facilities for every child in the country whose parents choose to send him to the "state" school. At the same time there are other schools run by private enterprise where a child may be sent on payment of more or less considerable fees. The number of such schools at present thriving in this country in spite of the high level of taxation is the measure of their popularity. The number of boys at Eton, we read, is increasing. Rightly or wrongly, parents believe they are getting something extra for their money by sending their children to such a school, and often they make great sacrifices so that their son may enjoy "the advantages of a public-school education." A similar point of view will certainly exist if state medicine and private medicine are allowed to parade side by side.

It is permissible to draw another analogy. Medical attention is an essential commodity. In this time of war, the Government has undertaken the responsibility of seeing that essential commodities, such as food and clothing, are made equally available to the whole community. In this case there is no provision for those who can afford it to procure such commodities privately by extra payment. Some do, and those people are rightly stigmatised and despised for their attempts to circumvent the Government's policy by resort to the black market.

I do not dispute that there are many people who would object to having a state service thrust upon them, whether they like it or not, or that there would be many who would prefer to pay their doctor privately despite the fact that they are entitled to his attention free of charge. In the inauguration and growth of such a scheme as this, some difficulties are bound to arise. But surely it is only a matter of education and propaganda to convince these people that a state service would provide for their complete medical needs, and that they would have nothing to gain by seeking attention outside the scheme.

The argument that, if Lady B. is prepared to do so, she should be entitled to buy a slice of her doctor's time over and above what is necessary for her purely medical needs is not a very good one. It is very doubtful if the patient is in the long run any better for indulging in such an extravagance, and this slice of time would be much better spent attending to other patients whose ill health makes their claim more valid.

I have recently had a certain amount of experience of public relations work, and at several meetings with the general public I have put this question of contracting out. The general impression has been, almost without exception, that if this were permitted, the profession would be suspected of trying to retain private practice for their own interests and thus lining their own pockets at the expense of those who could afford to pay.

The allied question whether a patient should be allowed to purchase additional comforts and amenities in the form of private accommodation is admirably dealt with in your issue of Sept. 25. This does not constitute contracting out, and there can be no valid objection to it. But there would be a real objection to the surgeon receiving an additional fee from that patient, because this would be the specialist equivalent to contracting out in general practice and all the arguments against it are equally valid in this case. The method of payment of the specialist has not been suggested as yet, but his remuneration from the state scheme, by whatever method, should be such as to cover all patients he is asked to attend, irrespective of their income. It is thus plainly absurd that he should be paid twice for the same case, once by the patient just because he happens to be affluent, and once by the state.

Lastly, may I say a word on how contracting out is likely to affect the medical profession. To permit it would place a weapon of great power in the hands of those responsible for fixing the remuneration of doctors if any form of state medical service comes into being, which might be used to our grave disadvantage. We are all anxious to preserve for our profession a standard of living to which we are accustomed. The government department concerned with remuneration will almost certainly take the attitude that if we retain private practice it is unnecessary to grant us on behalf of our "state" work an income comparable to that which we enjoy at present. We shall be expected in other words to make it up to this figure by the fees which we garner from those of our patients who elect to contract out. Very well, but will there be this measure of private practice to fall back upon in twenty years' time? The Government have stated that they envisage the gradual extinction of private practice (vide Sir John Anderson's speech to the Commons in the early part of this year), and Sir William Beveridge (para. 431 of his report) says: "The possible scope of private general practice will be so restricted that it may not appear worth while to preserve it." If the state scheme is a success, private practice must disappear as people realise that there is nothing to be gained by contracting out of it. Where then will be our standby? We shall be reduced to remuneration which was not at its inception intended to recompense us fully for the work that we do.

Our negotiations with the Government have two main functions, to produce an efficient medical service for the nation and to ensure that this provides an adequate standard of living for the doctors of the future. We shall fail in the second of these two responsibilities if we permit the adoption of a service available to the whole community with facilities for contracting out.

One final word. Let no-one read into these remarks a plea for a full-time state salaried service. Nevertheless, in spite of a resolution passed by the Representative Body, it is very probable that Assumption B of the Beveridge Plan will be carried out, and health provision made for the whole nation. Let us concede that if this does come to pass we must, however regretfully, say goodbye to private practice as we know it at present. The two are incompatible.

Eastbourne. A. LUCAS YOUNG.

MEDICINE AND THE COMMUNITY

SIR,—Like you I had noted and regretted that the proceedings of the recent BMA conference were rather negative, but it had not struck me that this was because we were "rather tired and rather grey," which is no dishonour when most of our younger members are in the forces. I rather thought that it was because, being practising physicians, we were more concerned with practical things than impractical dreams. It frequently falls to the lot of a doctor to have to bring his patient to earth, and sometimes this is necessary to prolong his life.

Faced as we were by the nostrum of one-track politicians we turned it down as decisively as we should the prescription of the one-remedy doctor. A full-time salaried medical service is mainly supported by the Labour Party and those associated with the TUC. If these will consider how they would welcome a suggestion by the doctors that, for the good of society, all manual workers should in future work on flat-time rates, no overtime, Sunday time, bonuses or piece rates, they will be helped to understand how appropriate and acceptable is their incursion into medical politics.

The BMA meeting was, in fact, clouded by the forthcoming white-paper. By rights this should have been anticipated as the dawn of a new day, but in view of our experience of the Ministry of Health the reverse was the case. Its record is, as Lord Dawson said, one of "obscurantism," and though he, after personal contact with Mr. Brown, is convinced that its outlook is now more helpful, Mr. Brown's last suggestion has probably antagonised the profession more than any act in the Ministry's history. It is small wonder therefore that the attitude of the conference was negative.

The sad part is that there is really no difference in aims. We all want the public to have the best service possible, and available as easily as possible. Those who are actually doing the work should have some idea as to how this is to be brought about, and it is only

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when doctors and Ministry work together and cease regarding each other as was common between employers and employees until recently that real progress is likely to take place. If Mr. Brown, as the employer, would give heed to the experience of personnel management in industry, I do not think he would find it difficult to win the profession to a less negative attitude, and no service can be satisfactory to the public unless conditions of employment for the doctors are satisfactory too.

Winsford, Cheshire. W. N. LEAK.

FEVERS IN THE FAR EAST

SIR,—Like others I have read with appreciation Dr. P. B. Wilkinson's observations (*Lancet*, 1942, ii, 67 and 1943, i, 210) on smallpox and cholera in Hong-Kong. Now that so many young medical officers are moving east without having seen smallpox, cholera or typhus, they must be prepared in whatever manner possible. May I stress this? *Take care your vaccinations take.* In recent years in Hankow I buried four Europeans (a British naval rating, a British consular official, an American naval dental surgeon and an American ex-senator tourist) who had all been "vaccinated" less than five years before and thought they had protection which they had not. Incidentally in China we had no trouble with conscientious objectors to vaccination—they contract the disease, and the question, for them, is settled whatever the outcome.

In 1909 I studied my first epidemic of cholera in our hospital in Hankow under Dr. J. A. Thomson, now of Harrogate. He will doubtless recall this, and will pardon me for suggesting that few in the United Kingdom would be better qualified to instruct young MOs in this disease and its treatment. The outbreak, caused by filthy ice, was brought to the European sisters and patients in the hospital by milk one Sunday morning. Those on full diet suffered severely, and we had hard work with our new saline-infusion apparatus (Cox's) to pull them through. One naval rating succumbed: he had a renal abscess. Three patients infected on the same day happened to be on a low typhoid diet—and in those days that was milk and nothing else. These were so mildly affected that had we not been looking for signs, we should likely have failed to recognise them. They complained of vague abdominal discomforts, and showed shrivelling of face and fingers, the usual shallow anterior chamber of the eye, and slight blueness. No treatment was required.

Men going to work in the east should be provided with Cox's outfit and taught to use it. Essentially it is a small filter-candle which acts as a siphon; it is boiled with the saline to be used for the intravenous infusion. One outfit can be used for two patients at one time; the lamp, with automatic regulation of temperature, is not necessary. The doctor new to this work tends to give too little fluid and too much salt: hypertonic saline should not be over a pint. The infusion is often given too fast after the first quart, but should not cease until kidney action is resumed. If the stomach still rejects fluids, then fluid per venam should be half-normal saline with 5% glucose. Excess of bicarbonate should be avoided. The doctor should use a glass cannula and tie it in; relapse may set in during the night and it is better that a trickle of fluid should continue. It is unwise to remove the vein cannula at night until recovery is well established.

Durban, Natal. A. H. SKINNER.

THE PROPER PLACE FOR CHILDREN

SIR,—Your peripatetic correspondent of Sept. 4 (p. 301) remarked: "It just isn't true that all small children will thrive in a day nursery." I am afraid many people cannot see round this problem: they are blinded by their own immediate fear or delight over their own successful effort. They do not look at the main facts when they say nurseries for the under-twos are bad or dangerous, that they will break up family life, or that mother love is everything. Mothers often give up loving because they are too tired and frightened; ignorance in caring for their children adds to their fears; peace goes from the home, so does respect, and this leads to a general break up, perhaps divorce. I prefer to work to give sound foundations in building home life; many women are uniting in demanding better education in child-care, better conditions for mothers, the setting up of nurseries as extensions of the home so that parents can go out together and the mothers need not be on duty—or tenterhooks—for 24 hours daily for ever. I was grateful when the *Lancet* quoted my views expressed at a meeting of the London Association of the Medical Women's Federation. The doctors were all so full of fear; my experience has taught me that they are wrong if proper conditions are given in the nurseries.

Piccadilly, W.1. H. V. ENTHOVEN,
Hon. Sec., National Society of Children's Nurseries.

FEEDING WITH AMINO-ACIDS

SIR,—In his letter of Aug. 28 Professor Brunschwig of Chicago states that, as far as he knows, no-one has ever thought of this method of alimentation as a substitute for the natural one per os. Over twenty years ago I was struck with the difficulty of feeding patients by nutrient enema, and I suggested to my teachers of physiology that the obvious thing to do would be to administer intravenously the breakdown products of the protein molecule—namely, the amino-acids. My enthusiasm was dashed by vague replies of possible violent reactions, and I am sorry now that I did not test this method out myself, for I still feel we have here a valuable method of feeding patients who cannot for various reasons be fed by the ordinary route.

Solihull. E. S. PAGE.

DUPLICATED OR REDUPLICATED

SIR,—Writing of accessory heart sounds in your issue of Sept. 25 a correspondent tells us categorically that "*re*duplicated means quadrupled." This statement seems to have been made without verification, and by superficial analogy with such words as reconsider, regenerate and resume. A doctor speaking thus in the sphere of philology is comparable with a patient in the sphere of medicine who should tell us categorically that his disseminated sclerosis had been caused by a heavy fall. The Latin prefix *re* has some half-dozen meanings which have descended into English. Here are 3 of them:—

1. "Again," which has misled your correspondent.
2. "Duly," "properly" or "as it should be by rights," as in render, relegate, remit.
3. The merely intensive meaning of "thoroughly" or "and no mistake about it," as in refrigerate, replete and reduplicate.

Clearly in usage (3) the prefix adds nothing to the essential meaning of the main word. The Shorter Oxford English Dictionary tells us that reduplicate means "make double" or "redouble," and that redouble means "double." The words iterate and reiterate provide an exactly similar instance of the same usage.

Medical School, London Hospital, E.1. W. J. PENMAN.

A NEW ASSOCIATION OF PHYSICISTS.—An inaugural meeting of the Hospital Physicists Association, held at the British Institute of Radiology on Sept. 24, was attended by 37 physicists drawn from hospitals all over the country. The aims of the new body are to discuss matters of mutual interest to those engaged in a branch of scientific work which has grown up largely in the last 30 years. Membership is open to physicists attached to hospitals, medical schools, and medical or biological research departments. The meeting was followed, on Sept. 25, by visits to the Middlesex, Royal Cancer and Westminster Hospitals, and the afternoon session was devoted to papers.

Dr. H. T. Flint spoke on technique with the various radium gram units; Prof. F. L. Hopwood gave an account of the betatron; Prof. Gilbert Stead discussed teaching for the diplomas and Prof. Sidney Russ dealt with the professional equipment of a hospital physicist. Professor Russ was elected chairman for the first year with Mr. C. W. Wilson, PH D, of Westminster Hospital as honorary secretary. Meetings are to be held thrice yearly at least. Professor Russ reminded his audience that the first full-time appointment as physicist to the hospital was made 30 years ago. Today between 50 and 60 physicists are engaged in hospital or medical research work.

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Obituary

GEORGE HENRY EDINGTON

MD, D SC GLASG, FRFPS, FRCS

Colonel G. H. Edington, consulting surgeon to the Western Infirmary, Glasgow, died on Sept. 24 at the age of 73 after a heart attack while fishing. He had been ailing for some time and had lately undergone an operation. From 1928 to 1940 he sat on the General Medical Council as representative of the Royal Faculty of Physicians and Surgeons, and his fellow counsellors appreciated his shrewd common sense and enjoyed his wit.

Son of a Glasgow ironfounder, Edington was educated at Kelvinside Academy and at Glasgow University where he qualified in 1891 and at King's College, London. When he took the English conjoint qualification in 1896 he had already obtained his Glasgow MD with commendation, and the following year he was elected FRFPS. In 1931 the FRCS was conferred on him. After holding lectureships in anatomy and surgery at the Western Medical School and the assistantship to the professor of clinical surgery at Glasgow University Edington was elected to the chair of surgery in Anderson's College in 1908, and in 1913 succeeded Beatson as visiting surgeon to the Western Infirmary. Shortly afterwards he also became lecturer in clinical surgery at Glasgow University, and he was also an extra surgeon at the Royal Hospital for Sick Children. He held the office of honorary physician in Scotland to the King from 1922 to 1927. His editorship of the *Glasgow Medical Journal* happily combined his interest in letters and medicine and many will recall his presidential address on embryological and clinical surgery to the Glasgow Medico-Chirurgical Society. Since 1940 he had presided over the Royal Philosophical Society of Glasgow, and in 1939 he became a member of the University Court. As a justice of the peace and deputy lieutenant of the county of the city of Glasgow he was a valued link between town and gown.

Colonel Edington joined the Volunteer Medical Staff Corps as early as 1901 and during the last war he served in Gallipoli; later he commanded the 78th General Hospital at Alexandria and was senior MO at a base camp in Palestine. He was appointed full colonel in 1916. With these Territorial interests went hand in hand his work for the Red Cross, and since 1930 he had been chairman of the Scottish executive committee. In this war his colleagues were anxious to draw on this varied experience and he became a member of the Scottish Civil Nursing Reserve advisory council and of the council of the Scottish National Blood Transfusion Service. Edington's colleagues and fellow citizens were quick to recognise the sterling value of his contributions to medicine and to the public life of Glasgow and his wide interests also won him many other friends outside his profession and his native city.

CHARLES GIBBS

FRCS

SOME men are remembered by students for their ward rounds, some for their exploits in the theatre or wit in the lecture room; but it was in the outpatient department that Charles Gibbs held the delighted and sustained attention of his class. An old student says of him:

"He was a ruthless leg-puller, but fundamentally kindly; and patients realised from the start that he was on their side. He taught vividly and with tremendous gusto. I remember him saying once that ours would be known as the Late Syphilitic Age because, though we had not yet found a drug to slay the spirochæte in a single onslaught, yet even a short or broken course of treatment made the patient non-infective, and syphilis would therefore die out. That was twenty years ago and of course he wasn't taking another world war into his reckoning. He made us look hard at lesions and memorise their characteristics. 'Punched-out ulcers, serpiginous in outline . . .' we would chant to his conducting; that jingle stuck to reinforce the visual memory, just as he intended it should."

He entered Charing Cross Hospital as a student in 1885, and qualified MRCS in 1890, taking his fellowship in 1893. He held all the minor appointments in turn, including those of surgical registrar, and lecturer on surgery and anatomy, becoming an assistant surgeon there in 1896.

P. D. writes: "Charles Gibbs was somewhat of a character at Charing Cross Hospital and as is usual in these circumstances was either very much liked or disliked; and he also either liked students (and staff) or actively disliked them. He had a humorous caustic tongue and never scrupled to use it, although in fairness it was generally used to drive home some telling teaching points. He believed in the question and answer method. Should a student fail to give a satisfactory answer or hedge, Gibbs would give him a hint or a lead to the correct answer, and then say: 'Yes, you *recognise* things, you don't really *know* them.'

In 1900, during the South African War, he was appointed surgeon to a field hospital entirely financed by Mr. Longman, the publisher. Conan Doyle was the physician. Gibbs spent a whole year or longer in South Africa, but was disappointed in the experience because so much of the work was medical—typhoid, dysentery, malaria and so on—and I do not think he got on with his colleague, which also probably was a disappointment, because he had some literary leanings himself. He was the last surgeon to teach anatomy at Charing Cross before the advent of the specialist; and I would gladly see the surgeon take again a more active part in this subject. Gibbs grounded the students thoroughly in those essentials so needed at the bedside and in the OP department, let alone the finals.

He was a good general diagnostician and his experience and knowledge acquired as surgeon at the Lock Hospital was of great service in his treatment of venereal disease, while his dexterity with the catheter enabled him to deal skilfully with stricture and prostatic cases. He was not really fond of operating, as so many surgeons are, but he was expert in his field and most neat in his technique. In genito-urinary troubles he showed considerable skill, and patients had great faith in him. He inherited Mr. Bloxam's dexterity in dealing with fractures, and was a perfect bandager. He took great interest in the management of the hospital and school and was for a time chairman of the medical and school committee—interests which he maintained after his retirement. But his greatness as a teacher, which every Charing Cross student will endorse, is his claim to a lasting memory."

For many years he was in charge of the prosectors of the Royal College of Surgeons. They used to prepare dissected "parts" for the various viva-voce examinations and he supervised their work strictly. At Charing Cross he followed Stanley Boyd and Waterhouse in charge of the anatomical department. During the last war he held a captaincy in the RAMC (T). When he died, on Oct. 5, he was senior surgeon to the London Lock Hospital, and consulting surgeon to Charing Cross. His published work included articles on sterility, impotence, the treatment of acute gonorrhœa, and the results of treatment of syphilis with French and English substitutes for salvarsan.

He married Kate, daughter of H. T. Northcroft, of Lancing, and had one son and one daughter. His wife died in 1940.

ADAM FULTON

MB RUI

Dr. Fulton, who died on Sept. 28 at Harrogate in his 75th year, was an Ulsterman with a big heart and a fine intellect, who would have made his mark in any branch of medicine. He chose general practice and after 30 years of it was willing to place his experience at the disposal of the Ministry of Health in building up the regional medical service. Born at Cookstown, co. Tyrone, he was educated at the Royal Academical Institution and Queen's University, Belfast, taking his arts degree in 1888 and the MB in 1893 when he was twenty-seven. He had held a scholarship in natural history and taken prizes in surgery and midwifery. Then after residence at the Belfast Royal Hospital he went as assistant to Dr. H. J. Neilson of Nottingham and soon entered into a partnership that lasted until 1920. During this time, Dr. Neilson writes, "we never had a single disagreement, and the practice flourished so that for many years we had five fully qualified assistants and two nurses to help us." Fulton took

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his natural place in public life; he became JP, was vice-chairman of the city health and insurance committees, and a member of the NHI advisory body. During the last war he helped to organise medical manpower in a way that was an example to the central professional committee. He was president of the Nottingham Med.-Chir. Society and a member of the BMA council 1913–20. In the latter year the partnership was dissolved when both partners were appointed divisional officers of the Ministry, a large part of the reorganisation and development of the regional service falling to their lot. Fulton lived first at Southport and for the past 17 years at Harrogate where, after nominal retirement, he became chairman of the medical recruiting board and took charge of the police convalescent home. He was an elder of St. Paul's Presbyterian Church, the Minister of which recalling his loyalty and generosity said: "Poor people, old people and young people will bless his memory." In all his work he was ably supported by his wife Nina, daughter of the Rev. G. E. Fox of Swillington, Leeds, who survives him.

DR. E. C. SMITH

AN RAMC pathologist writes: E. C. Smith was a tall, striking and yet gentle figure of a man. He combined an Irish sense of humour with a gracious and friendly attitude towards men and things he approved. Because his tastes were wide and his tolerance deep, he was seldom without a guest to share and enjoy the amenities and atmosphere of his delightful bungalow at Yaba. To RAMC officers who worked in or passed through Lagos he was especially generous. Smith said he got from these contacts as much pleasure as he gave, but that opinion can be taken only as a measure of his own modesty.

I recall my first meeting with him at Medical Headquarters. We spent a little time weighing each other up and then he said, "Look—this is no place for a proper talk; come on out to Yaba." It was the first of many visits and the beginning of a friendship I greatly valued. He was personally and professionally a most generous man. I had the pleasure of collaborating with him in one investigation and of sharing his confidence about the many other projects he had in hand. He was a beautiful technician and an international figure in tropical pathology. He was proud of the history of Yaba, and his conducted tours of the vaccine farm, yellow-fever compound and research laboratories were models of how these things ought to be done.

As a host he was unequalled. He played a shrewd and vigorous game of tennis, organised bathing expeditions to Victoria beach before breakfast, talked lightly or seriously, lent books of every kind and knew how to meet a wide variety of musical tastes from his collection of gramophone records. For himself Mozart was the composer whose works gave him most enjoyment.

He had done twice the normal length of tour, being kept at his post by a high sense of duty and a consciousness of the war-time needs of the public service and of the Army. He was literally driven out to take the leave he had so fully earned. His death by enemy action on his way back to duty is a tragic loss both personal and professional.

Flight-Lieutenant JOHN KENNETH DENHAM died during May while on active service at the age of 37. He studied medicine at Cambridge and St. Thomas's Hospital and graduated MB in 1938. After holding house appointments at St. Thomas's, the Brompton Hospital and the Western (LCC) Hospital, Fulham, he was appointed to a commission in the medical branch of the RAF volunteer reserve, and when he died he was medical officer to a squadron operating overseas.

Flight-Lieutenant KENNETH WALTER MONKS, who died at sea on Sept. 16 at the age of 34, studied medicine at Cambridge and St. Thomas's Hospital and qualified MRCS in 1937. He was appointed whole-time civilian medical practitioner with the Royal Air Force later in the same year and held this appointment until he was commissioned in the medical branch of the RAF Volunteer Reserve soon after the outbreak of war.

Notes and News

PAPWORTH POLICY

IN an unspoken speech, published as an appendix to *Papers of a Pioneer* (Hutchinson, pp. 107, 6*s*.) Varrier-Jones asked: "Do our anti-tuberculosis measures have the effect of re-establishing our patients in their former status or standing?" And his answer was: "We are prolonging their lives, yes. But we are doing so in a manner which destroys the value of those lives." The credit in the account of the consumptive, it was remarked in a leading article (*Lancet*, 1939, i, 31), is always a very small one. It was Varrier-Jones's doing that the unalterable Friendly Society rule forbidding a member to engage in any form of labour while in receipt of sick pay was annulled in favour of the sanatorium-leaver who was to be "allowed to do such light work as may be prescribed by a qualified medical practitioner as part of his treatment." That was the result of an approach made by him and Sims Woodhead, with Clifford Allbutt presiding, to leading officials at Cambridge in August, 1915. In the following year was started the Bourn colony, the precursor of Papworth Hall, of which the administration and policy were (in Sir Walter Langdon-Brown's phrase) "a mixture of medicine, economics and sociology." The combination has eased a situation which is still perplexing enough but no longer insoluble. Papworth showed once and for all that rehabilitation of the consumptive was feasible. The medical consultative committee which now controls the policy both of Papworth and of Enham Village Centre consists of Mr. G. E. Gask, Dr. Fredk. Heaf, Mr. John Hunter, Sir W. Langdon-Brown, Sir Arthur MacNalty and Prof. J. Paterson Ross, with Wing-Commander R. R. Trail as chairman. Wing-Commander Trail is also chairman of a board composed of all parts of the Papworth organisation—medical, nursing, domestic, industrial, appeals and public relations. Varrier-Jones's wine may need no bush, but since, on excellent authority, to good wine they do use good bushes, Dr. Geoffrey Marshall is shortly to give the third lecture in the memorial scheme.

HOT SPRINGS AND AFTER

A MEETING of the Scottish group of the Nutrition Society was held on Oct. 2 to discuss the recommendations of the International Conference at Hot Springs. Papers were given by Dr. KARL EVANG, surgeon general of the Norwegian public health services, and by Mr. F. L. MCDOUGALL, economic adviser to the High Commissioner of Australia, both of whom had been delegates to the conference. Dr. Evang had been impressed by the unity of the conference. The experts in nutrition, economics and agriculture who attended represented about 75% of the population of the world. In peacetime between a third and a quarter of the population of Western Europe were undernourished, but in India the large majority of the people did not get enough to eat. The answer of the conference to this situation was international expansion of food production with coördinated transportation and distribution over the whole world. Each country would be responsible for seeing that every citizen received an adequate diet, and special attention would be given to the more vulnerable groups, pregnant and nursing women, babies and children. The conference had created a world conscience in regard to food-supply.

Mr. McDougall emphasised that the conference differed from previous ones in that governments had appointed as delegates technical experts who really did know something about the subject and who had authority to discuss fully the subjects of food and agriculture, though without committing the governments. The countries of Western civilisation are already well organised and would need little assistance. In such countries as China and India, where the population already pressed severely against the means of subsistence, it would not be possible to bring about important changes unless simultaneously industrialisation could be increased. In the Middle East, in Africa and in Latin America, where there is no pressure of population, the application of the Hot Springs resolutions could bring about in a few years an astonishing improvement in the standard of living. Mr. McDougall thought it important that the permanent organisation should gain the goodwill and active interest of medical schools, research institutes and all bodies which might act as training-centres for its staff and supply the teams of experts which were to be sent to help backward countries.

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Sir JOHN ORR thought that if the nations accepted the recommendations and carried them out, there would be an ascending spiral of prosperity and expansion of world industry and agriculture. Some people doubted whether the proposals would be carried out. The British Government had already accepted them and were bound to carry them out, but it was important that there should be a well-informed and strong public opinion in favour of their adoption if they were to be made fully effective.

THE DISAPPOINTING CHESTNUT

EVERY autumn new horse-chestnuts, shining like old mahogany, challenge our ingenuity: there *must* be some use for anything which looks so attractive. Boys believe they have found the answer in the game of conkers, but their elders remain jealous and dissatisfied. Temperton[1] has recently been experimenting with horse-chestnuts as poultry food, encouraged by their chemical composition which closely resembles that of barley. The trouble is in the flavour. Esculin, a glycoside, is one of the constituents; it is a saponin and produces a soap-like foam in the mouth when cooked horse-chestnuts are chewed. It leaves a sweet flavour later turning to a bitter after-taste due to the presence of *l*-rhamnose and gallotannic acid. Four groups of four pullets each were fed with horse-chestnuts on the following plan: group 1, raw chestnuts; group 2, boiled chestnuts; group 3, chestnuts steeped in water for 48 hours and cooked; group 4, chestnuts leached in warm water for 48 hours after cooking. Chestnuts in the various forms were added at the rate of 2 oz. per head to a mash consisting of 4 oz. of laying meal. The hens disliked them; even when attempts were made to get rid of the bitter taste. Group 1 threw the bits of chestnut out of the trough and ate only the meal. Groups 2, 3 and 4 were unable to discriminate in this way because the cooked chestnuts were intimately mixed with the meal, so they left the whole ration untouched. A new set of hungry birds who had not eaten for 24 hours were offered all four rations, and after a preliminary peck refused to touch them. Besides being unpleasant to eat, horse-chestnuts are difficult to keep. They had been collected by local school-children, and were stored in thin layers on the floor of an airy shed; yet even so, at least half were attacked by fungi and could not be used for the experiment. On the whole the horse-chestnut tree seems to have evolved a fool (and man) proof seed. Perhaps after all the proper use for horse-chestnuts is to make more chestnut trees.

University of Oxford

Dr. S. A. Sarkisov, professor of neuropathology in the Moscow Brain Institute, will deliver a lecture at the department of human anatomy, at noon on Friday, Oct. 22, on problems of cortical localisation.

University of Sheffield

At recent examinations the following were successful:

MD.—R. B. Knowles.

Final Examination for MB, ChB (Parts II and III).—J. W. Greaves, Arthur Pickin, and Winifred M. Smith.

Royal Society of Tropical Medicine and Hygiene

A meeting will be held at 26, Portland Place, London, W.1, at 3 PM on Thursday, Oct. 21. Sir Harold Scott will deliver his presidential address on the slave-trade and its influence in the spread of tropical disease.

A National Health Service

Dr. Stark Murray will give three lectures to the Central London Fabian Society on this subject at 7.30 PM on Tuesdays at the Artworkers' Guild Hall, 6, Queen Square, W.C.1. On Nov. 23 he will speak on a personal health service, on Dec. 7 on administration and control, and on Dec. 21 on the ultimate aim.

Post-war Nutritional Relief

The Nutrition Society is holding a conference on this subject at the London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1, on Saturday, Nov. 6. Lord Horder will be in the chair and Prof. J. R. Marrack will speak on past experience and present position, Mr. John Hammond, FRS, on problems of production, Miss E. M. M. Hume on opportunities for nutritional research. Further details of this meeting may be obtained from the hon. secretary, Mr. Leslie J. Harris, D SC, Nutritional Laboratory, Milton Road, Cambridge.

1. Temperton, H. *Nature, Lond.* Sept. 25, p. 345.

British Association of Physical Medicine

A meeting will be held at 11, Chandos Street, London, W.1, on Wednesday, Oct. 20, at 5 PM, when Lord Horder will deliver the inaugural presidential address.

British Institute of Philosophy

On Friday, Oct. 22, at 4.30 PM, Prof. J. W. Harvey will address the institute on community purpose and the lessons of Nazism. Cards of admission may be had from the director of studies at University Hall, 14, Gordon Square, W.C.1, where the meeting will be held.

Royal Society of Medicine

There will be a general meeting of fellows at 5 PM on Tuesday Oct. 19. At 2.30 PM., on Oct. 20, Mr. J. T. Edwards, D SC, will give his presidential address to the section of comparative medicine on the limitations and uses of the comparative method in medicine. At the same hour at the section of physical medicine Dr. Philippe Bauwens will deliver his presidential address on electrodiagnostic interpretations and misinterpretation in nerve injuries. At 4.30 PM, on Oct. 21, at the section of neurology, Prof. S. P. Bedson, FRS, will speak on the present position with regard to the epidemiology of poliomyelitis, and Prof. H. J. Seddon on poliomyelitis in Malta. On Oct. 22 at 3 PM Sir Weldon Dalrymple-Champneys is to give his presidential address to the section of epidemiology and state medicine. He has chosen as his subject an examination of the place of the doctor in the state, from ancient times to the present, together with some speculation in regard to the future. On the same day at 4.30 PM Sir Joseph Barcroft, FRS, will read a paper to section of disease in children on fœtal movement especially in relation to the onset of respiration.

Medical Casualties

The following casualties among medical officers have been announced:

Missing, believed killed.—Surgeon Lieutenant C. M. Davies, MRCS, RNVR; Lieut.-Colonel Hartas Foxton, MC, MB LEEDS, RAMC; and Surgeon Lieutenant G. C. Glennie, MB EDIN., RNVR.

Prisoners of War.—Surgeon Lieutenant J. P. Corcoran, MB NUI, RN; and Colonel V. H. Wardle, MC, LRCP, RAMC.

Births, Marriages and Deaths

BIRTHS

BOYLE.—On Oct. 1, at Bromley, the wife of Captain A. C. Boyle, RAMC—a daughter.

BRADBURY.—On Oct. 4, at Belfast, the wife of Surgeon Lieut.-Commander E. B. Bradbury, RN—a daughter.

COURT.—On Sept. 15, in London, the wife of Dr. Donald Court—a daughter.

EDWARDS.—On Oct. 7, at Woodford, Essex, the wife of Dr. Alan Edwards—a daughter.

KEELE.—On Oct. 3, in London, the wife of Dr. C. A. Keele—a son.

KELLETT CARDING.—On Oct. 8, at Redhill, the wife of Captain D. M. Kellett Carding, RAMC—a son.

KEY.—On Sept. 30, in Edinburgh, the wife of Captain James Key, RAMC—a son.

PLATT.—On Oct. 7, in London, the wife of Dr. B. S. Platt—a son.

POCHIN.—On Oct. 3, at Poole, the wife of Dr. E. E. Pochin—a son.

WATSON.—On Oct. 2, at Woking, the wife of Surgeon Lieutenant Howard Watson, RNVR—a daughter.

WOOD.—On Oct. 1, in Oxford, the wife of Surgeon Lieutenant E. J. Wood, RNVR—a son.

WOOLMER.—On Oct. 3, at Aberdeen, the wife of Surgeon Commander R. F. Woolmer, RNVR—a daughter.

MARRIAGES

BROCKLEBANK—RENDELL.—On Sept. 25, at Netley, John Alfred Brocklebank, MD, MRCP, major RAMC, to Winifred Rosa Rendell of Edmonton, Alberta.

GOODDY—DEAS.—On Oct. 7, in London, William Walton Gooddy, MB, RAMC, to Edda Deas, MB, RAMC.

LAWSON—MARLOW.—On Oct. 2, in London, David Lawson, MRCS, to Belinda Marlow.

DEATHS

BEDINGFIELD.—On Sept. 28, at Rugby, Henry Bedingfield, DSO, MD EDIN., MRCP, formerly of Leeds.

BUCK.—On Oct. 8, Walter Buck, LRCPE, aged 79.

COCK.—On Oct. 9, at Appledore, Kent, Frederick William Cock, MD DURH., JP, aged 85.

DONALDSON.—On Oct. 2, at Wisborough Green, Sussex, John Donaldson, LRCPE, lieut.-colonel late RAMC, aged 83.

GIBBS.—On Oct. 5, at Thames Ditton, Charles Gibbs, FRCS.

GIMLETTE.—On Oct. 4, at Epsom, Sir Thomas Gimlette, KCB, MRCS, surgeon rear-admiral RN.

NIXEY.—On Oct. 6, Essex Frank Wake Nixey, MB EDIN., medical superintendent of St. John's Hospital, S.W.11.

WILSON.—On Oct. 7, at Ongar, Geoffrey Remington Wilson, MB CAMB., JP.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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SPONTANEOUS SUBARACHNOID HÆMORRHAGE

A REVIEW OF 150 CASES

C. GAULTER MAGEE, F R C P E, D P H
TEMP. PRINCIPAL MEDICAL OFFICER, MINISTRY OF PENSIONS

IT is now twenty years since Symonds (1923) applied the spur to British interest in this subject by his publications in the *Quarterly Journal of Medicine* and *Guy's Hospital Reports*. The general demand for greater refinement in diagnosis, the aid afforded by radiology with its exploitation of opaque media in the delicate business of radiography and the determination of surgery to play a part have jointly served to sustain the interest then aroused, and a fairly large volume of literature on the anatomy and pathology of the circle of Willis has accumulated.

ANATOMY AND PATHOLOGY

Apart from the well-known derivation and construction of the circle of Willis there are less obvious features which are unique in anatomical architecture and of these must be cited the singular setting of this vascular circuit in a fluid space dependent only on the hydrostatic support of the fluid in the cisterna interpeduncularis, the acute angles of offset of the branches and, it is now suggested, the impact of a double thrust on each communicating branch with every cardiac systole. There may be some compensatory mechanism in operation to deal with the resultant effects of this, but in any event the presence of currents and eddies in the communicating arteries from a simultaneous influx at both ends would seem to invite mural abnormality.

The cerebral vessels belong to the medium-sized or muscular group of arteries and much controversy has surrounded the relative importance of structural abnormality of the media of these vessels as forming "loci minoris resistentiæ" leading to aneurysmal dilatation. A decade ago Forbus (1930), Schmidt (1930), Strauss and his colleagues (1932) following up the work of earlier pathologists, were apparently unable to reach complete agreement on the main issue of structural defect or degeneration as the most important factor. The excellent histological, embryological and hydrodynamic studies of Forbus on the circle of Willis resulted in the convincing argument that the principal cause of aneurysm of the cerebral arteries is a muscular defect of the media located in that portion of the vessel wall forming the acute angle of bifurcation, that this defect dates from intra-uterine life, and that the point of maximum pressure in the vessel wall under ordinary conditions of circulation corresponds with the site of medial defect. Finally, Forbus concluded that, though the muscular defect is the basis of dilatation, degeneration of the internal elastic lamina due to continual overstretching is the final stage in the production of the sac.

But these views did not command universal acceptance. It has been emphasised that muscular defect at points of bifurcation is a relatively common arrangement in arteries other than the cerebral, especially the coronary and mesenteric vessels; but it is only in the cerebral arteries that one finds aneurysmal sequelæ. In this regard Fetterman and Moran (1941) report their findings on the examination of 200 brains from consecutive autopsies in the three years 1936–39, with special reference to defects in the circle of Willis. They found that arterial circles of the type usually described as "normal" were found in less than half; and 23% showed interruptive anomalies involving the posterior communicating branches alone. The conflict of opinion as to structural and degenerative effects as the major issue in causation led Glynn (1940) to re-examine the question. As a result of the careful examination of the bifurcations of vessels in 10 cases of aneurysm of the circle and in 15 controls without aneurysm, and by simple inflation experiments to determine the relative importance of muscular and elastic tissue in resisting distension he concluded that medial defects per se were of little importance but that the concentration of the elastic tissue in the internal elastic lamina in the cerebral vessels, instead of being distributed throughout the media and adventitia as in other vessels, rendered this tissue more vulnerable to injury and therefore to degeneration.

ANALYSIS OF MATERIAL

The present inquiry was first directed to the influence of physical stress as a possible ætiological factor in the rupture of congenital aneurysm in the circle of Willis and the consequent presence of blood in the subarachnoid space. Most of the cases collected have been presented to me in the course of my routine work in adjudicating on claims to pension made by members of the Forces or civil defence services, but I have included a small number seen personally in civil practice. The data from the major fraction of the series (that from the Services) have been obtained entirely from the examination of records and in no instance have I seen a Service case clinically. The cases have been carefully selected to include only examples of spontaneous rupture or—in the few cases where minor trauma could not be excluded—of aneurysm demonstrated at autopsy. Gross head injury has been absolutely excluded and care taken to eliminate those cases of intracerebral hæmorrhage which may, by the violence of their occurrence, plough their way inwards or outwards to reach the subarachnoid space. The numerous data at my disposal forced a much wider review of the subject than was entailed in the original terms of reference and it has been possible to examine the material presented on the wider plan outlined below.

1. *Age and sex.*—Certain limitations will be obvious under this heading—e.g., the general age-limits of recruitment for the Armed Forces and the preponderance of men in the earlier days of the war. It may be stated, however, that of 35 cases occurring during the first six months of 1942 there were only 2 females, and this at a time when recruitment of women must have reached a high level.

Having regard to these limitations set by recruitment, the impact of subarachnoid hæmorrhage on the age-groups is shown in table I. The conclusion to be drawn

TABLE I—AGE-INCIDENCE IN 150 CASES

Age (years)	Cases	Per cent	Approximate age-grouping (per cent. in Forces during 1914–18 war
Under 20	9	6	24
21–30	76	50	52
31–40	56	37	22
41–50	9	6	2

is that the incidence is low under the age of 20 and thereafter rises and continues to rise sharply throughout the age-groups under consideration. The influence of age on recurrence, death, good functional recovery and recovery with such complications as hemiplegia, vertigo, fits, and diplopia, has also been examined (table II).

TABLE II—INFLUENCE OF AGE ON DEATH, RECURRENCE AND RECOVERY

Age in years	Cases of hæmorrhage	Recurrences	Deaths	Recovery	
				Good	Partial
Under 20	9	3	5	3	1
21–30	76	25	37	26	13
31–40	56	21	37	15	4
41–50	9	1	5	1	3
Totals	150	50	84	45	21

In the 21–30 age-group recurrence followed in 33%, death in 48% and a good recovery in about 35%. For the 31–40 age-group the results are somewhat less favourable, recurrence following in 37%, death in 66%, and a good recovery in only 27%. In the 41–50 group good recovery is rare.

2. *Previous health and family history.*—No information of value, apart from the headaches and ocular signs discussed later, was gained from the examination of recorded former personal or family history. Refractive

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errors 22, epilepsy 4, rheumatic infection including tonsillitis 9, as episodes in the previous personal history, would appear to represent the incidence in a fair cross-section of the population.

3. *Mode of onset, trauma, exertion, rest.*—Extensive inquiries have been made in each case as to contemporary or previous trauma or physical strain. Examples of hæmorrhage into the subarachnoid space as an accompaniment of gross cerebral trauma have been carefully excluded from the series, but in 8 cases out of the 150 a comparatively minor trauma would seem to demand recognition as the determining ætiological factor. The type of trauma is that associated with heading a football, or a simple fall; symptoms developed in under five minutes in 3 cases, in under three days in 3 cases, in a week in one case. In the 8th example a rather more severe fall on the back of the head about two months previously had been followed by a period of indefinite ill health until the major catastrophe. Of the 8 cases 6 died and autopsy was carried out in 5, in all of which aneurysms were found. The following case is a good example of apparently trivial injury giving rise to serious cerebral complications.

A man, aged 48, was involved in a motor accident on March 3, 1942. He received no apparent injury and remembered every detail of the incident. He was certain he had received no head injury. He complained of slight headache very soon afterwards but nevertheless continued his tour of duty and even filled in the accident form. The following day he thought he was a little clumsy with his right hand. On March 5 he fainted, vomited, and presented clinical signs of raised intracranial pressure. A few days later a lumbar puncture was done and a bloody fluid was found. His condition varied over the next three or four days, but on March 12 he was noted to have papilloedema and on March 13 he developed right hemiplegia, became drowsy and had neck rigidity. For the next fortnight he had several attacks of drowsiness with diplopia and visual hallucinations of the complex type—seeing figures, semicircles, &c. He died on March 29. Post-mortem examination showed a small saccular aneurysm of the right anterior cerebral artery ruptured into the right frontal lobe.

In regard to exertion and effort 15 cases only claimed or could be related to physical strain, and a liberal interpretation of the expression is required to embrace even this number. Four of the subjects were playing football (this number does not include 2 others who headed a wet football and are included under trauma), 2 were cycling, 2 were doing physical training exercises, one driver was stricken while pulling a heavy canvas over his lorry, a furniture remover while carrying a heavy chest, one soldier collapsed on a cross-country run and another while lifting a cart-wheel. It will no doubt be admitted that in few of the above 12 cases, in which the hæmorrhage commenced *immediately*, could support be given to a serious claim of unusual stress as a precipitating factor. In the remaining 3 cases of *delayed* onset the relationship is even more obscure. In one case symptoms commenced in the evening following a full day's military training, one was claimed to be due to exceptionally hard work as a stoker and the third to the heavy work of an Army baker, who had to lift heavy weights and to perform strenuous acts of kneading.

As against the postulated perils of physical strain there were 135 cases (90%) to which no such cause could be assigned nor indeed was claimed. These subjects were going about their common tasks when they were overtaken. In 43 of them there is a clear and definite history of onset while in bed, or rising from bed, or in the home or office or cinema; 10 more of them were out walking, one was dancing. There is thus pressing evidence against acceptance of physical strain as an ætiological factor.

4. *Premonitory symptoms or antecedent signs.*—These were sought in headache, ocular anomalies and in any other notable cerebral or somatic disturbance. 18 of the cases gave a history of headache for months or years and one half of them attached the label of migraine; 3 of the 18 no doubt deserved the designation of ophthalmoplegic migraine, for the premonitory subjective visual disturbance was followed by ocular palsy when the major attack developed. One other case deserves description not only for its migrainous accompaniments but also for its demonstration of the truth of the argument of the preceding paragraph on rest and strain.

A van driver, aged 25, had tonsillectomy at the age of 6, since when he had been subject to three or four "bilious attacks" per year. These attacks start with blurred vision, are followed by a sense of numbness of the hands, especially the left, and culminate in vomiting and headache. The attacks last six hours. On July 1, 1941, he had a severe attack, became aphasic and then unconscious. He was detained three weeks in hospital. On July 9, 1942, he was an inpatient awaiting a second tonsillectomy when, at 7 AM one morning, he felt sick, complained of a severe headache, became drowsy and then unconscious. On examination he was found to have neck rigidity, a positive Kernig and a bloody CSF. Next day he passed again from unconsciousness to drowsiness and complained of severe frontal and occipital headache. No deviation from the normal was found in the optic discs and in all other respects the central nervous system appeared to have recovered. The blood-pressure was 110/70 mm. Hg and the pulse-rate 50. From this date he made a gradual recovery and by July 31 presented no sign whatever of any abnormality.

Apart from the headaches and ocular anomalies the only other findings on inquiry into premonitory symptoms was the complaint of notable lumbar pain in 3 cases—one week, three weeks and eight weeks before the major attack.

5. *Presenting symptoms and signs.*—The main signs and symptoms can be seen in table III. Among the 16 ophthalmoplegic cases aneurysm was found in one by arteriography; with one exception (in which the basilar was affected) the aneurysms in these cases lay in the anterior half of the circle or its branches. Albuminuria, often massive, was found in 15 cases and glycosuria in 7. In all cases these findings were transitory. Hæmatemesis or coffee-ground vomit occurred in 3 cases. There were no other abnormal or unusual signs.

TABLE III—PRESENTING SYMPTOMS, SIGNS AND OTHER FINDINGS IN 150 CASES OF SUBARACHNOID HÆMORRHAGE

Findings	Cases	Remarks
Pyrexia	9	Usually 100–103° F.; one case 106° F.
Pulse-rate—		
Over 70	5	Out of 29 observations.
40–60	23	
Headache	105	14 occipital.
Loss of consciousness	75	—
Neck rigidity	77	—
Convulsions	19	—
Vomiting	64	—
Vertigo	25	—
Photophobia	11	—
Diplopia	8	5 came to autopsy: aneurysm demonstrated.
Objective ophthalmoplegia	8	
Papilloedema	11	Noted on 1st day in 5 cases; latest case appeared on 13th day.
Vascular hypertension—		
Diastolic over 100 mm. Hg	7	Blood-pressure recorded in 63 cases.
Systolic over 150	11	
Wassermann or Kahn test	35	All negative.

TABLE IV—RELATION OF FINDINGS TO PROGNOSIS IN 150 CASES OF SUBARACHNOID HÆMORRHAGE

—	Cases	Died	Mortality-rate per cent
Loss of consciousness	78	48	61
Convulsions	17	9	53
Vomiting	64	34	53
Papilloedema	11	6	54
Unconsciousness—			
With vomiting	33	21	63
With convulsions	12	5	58

In the whole series of 150 cases the mortality-rate was 56% (84 deaths). It would be natural to inquire in a serious condition of this type whether any aid in prognosis may be obtained from a rapid survey of the clinical picture as found on first presentation, so an attempt has

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been made to glean some precognition from the presence or absence of unconsciousness, convulsions, vomiting, papilloedema or the blood-pressure reading (table IV). With the possible exception of slight worsening in outlook in the presence of unconsciousness nothing of great prognostic value is to be found as a result of these inquiries, and table V seems to justify the conclusion

TABLE V—THE SYSTOLIC BLOOD-PRESSURE (IN MM. HG) IN 63 CASES

—	Under 100	100–110	110–120	120–130	130–140	140–150	Over 150
Recovered	2	8	6	5	9	1	5
Died ..	0	1	5	8	5	2	6
Total ..	2	9	11	13	14	3	11

that no help in prognosis is to be obtained from the sphygmomanometer.

6. *Cerebrospinal fluid.*—In every case either by lumbar puncture or at post-mortem examination the CSF was frankly hæmorrhagic or xanthochromic. This finding is the corner-stone of the present investigation. No other findings of value eventuated.

7. *Autopsy reports.*—Of the 84 fatal cases, 58 were brought to autopsy and in 43 a ruptured aneurysm was found. In two cases 2 aneurysms were found, in one 3 aneurysms were found and in a fourth several are mentioned but the number is not specified. As regards site, the following analysis shows that they are much more common in the anterior half of the circle and also on the right side than on the left.

SITE OF ANEURYSM IN 43 CASES OF RUPTURE

Left anterior cerebral artery	2	Anterior half of circle = 27
Right anterior cerebral	5	
Left middle cerebral	5	
Right middle cerebral	7	
Anterior communicating	8	
Left vertebral	1	Posterior half of circle = 9
Right vertebral	0	
Basilar	4	
Left posterior cerebral	0	
Right posterior cerebral	2	
Left posterior communicating	0	
Right posterior communicating	2	
Site not specified	7	

The incidence on the right side of the circle is twice as heavy as on the left side. This is reflected clinically in the material at my disposal, for in those cases temporarily accompanied or followed by paresis or hemiplegia the left side bore the brunt in 21 cases as compared with 14 right-sided paralyses. This incidence is the reverse of the common experience in intracerebral hæmorrhage of other varieties. There were few other striking post-mortem findings. Congenital horseshoe kidney was found in 1 case, cystic kidneys in 1, the thymus gland was reported as "present" in 2 cases, a duodenal ulcer was active in 1 case and in 2 others atheroma of cerebral of other vessels noted.

8. *Recurrences.*—Particular regard has been paid to the interval after the first attack, the regime adopted in the treatment throughout—rest, exercise, &c.—the relation of recurrence to age, blood-pressure, and to the site of aneurysm in cases which came to autopsy, and to the general significance of persisting symptoms. The prognosis in cases of recurrence has also been examined. A second hæmorrhage occurred in 50 of the 150 cases. This is a high exposure to jeopardy but it is even more alarming when mention is made of the fact that of the 150 subjects here considered 52 died in the primary attack. The 50 recurrences therefore were found among 98 survivors of the first attack. And 32 more failed to recover. Recurrences have been subjected to careful scrutiny with regard to: the latent period; the result; the site of aneurysm; and the relation to rest and exercise. The last-named is a feature of the discussion.

The latent period and results are best appreciated by the study of table VI, from which it will be seen that the major incidence of the second attack falls in the first month with a peak in the third week. Conclusions as to the mortality-rate are scarcely justified from a small series of cases but it appears to rise steadily to the fourth week and then fall sharply. As to the site of aneurysm found in those cases of recurrence which were subjected to autopsy the same preference for side and anterior position is noted as in cases fatal at the first attack. No particular vessel appears specially prone to recurrent bleeding unless it be the right middle cerebral which provided 4 out of 12 examples of aneurysm found at autopsy in this group of repeated rupture.

TABLE VI—LATENT PERIOD IN 50 RECURRENCES

Period within which recurred (weeks)	*Cases*	*Died*	*Period within which recurred (weeks)*	*Cases*	*Died*
1 ..	4 ..	3	6 ..	4 ..	2
2 ..	9 ..	5	7 ..	3 ..	1
3 ..	12 ..	8	8 ..	0 ..	0
4 ..	7 ..	7	Over 8 ..	7 ..	5
5 ..	4 ..	1			

9. *Results.*—Expectation of life and competence have been noted. In this series of 150 cases 105 either died or were seriously crippled by paralytic sequelæ, incapacitating headache or vertigo. At periods varying between six months and four years 22 cases have been re-examined, and some idea of the end-result may be ascertained from table VII.

TABLE VII—RESULTS TO DATE IN 22 RECOVERED CASES OF SUBARACHNOID HÆMORRHAGE

Case	Interval (months)	Remarks	Present complaint
1	15	Working as school attendance officer.	Sense of lightness in the head only.
2	8	Working in a factory.	Headache on waking, occasional giddiness.
3	12	Working.	Attacks of right frontal headache.
4	12	Three weeks' work only.	Constant pain in head, photophobia, blepharospasm.
5	8	No record of work.	Occasional headaches, poor memory; exophthalmos, no thyroid enlargement.
6	6	Half-time work.	Headache, listless, improving.
7	12	Baker; no loss of time since recovery.	No complaints.
8	18	At former job without loss of time since recovery.	Headache, lassitude; improving.
9	18	Munition worker; no loss of time since recovery.	Pain in back.
10	24	Not worked.	Headache, dizziness.
11	24	Doing important job.	Great improvement.
12	12	Working as messenger.	Right-sided headache.
13	6	No record.	Feels fit.
14	6	No record.	Slight backache.
15	6	Working as accountant.	No complaints.
16	12	Not working.	Hemiplegia.
17	18	Cannot keep a job.	Headaches, giddiness.
18	24	No work.	Constant headache.
19	6	Working as clerk.	Still has headaches.
20	6	Cashier; has worked without loss of time since recovery.	Headaches. Poor memory. Drowsiness.
21	48	Working as a barman.	Continuous headache.
22	18	Presumed working.	Very slight headache.

DISCUSSION

The relation of physical strain to subarachnoid bleeding and to rupture of aneurysms of the circle of Willis was the primary object of this investigation. The incapacitated are quick to invoke strain as the fons et origo of many of their ills; and the sight of blood, or knowledge of bleeding, is almost invariably referred to some form of muscular effort or physical strain. It is therefore rather a striking feature of the clinical history in the cases now under review that few are disposed to advance this claim of relationship; it becomes almost unaccountable when one remembers that a considerable proportion are candidates for pension. For the few who do so claim (and in justice to those who do not) we must ask ourselves whether, on the available information, a case has been made for invoking physical strain as the major precipitating factor or indeed as playing any part whatever in determining the onset of subarachnoid hæmorrhage. Are the claims of the furniture-remover and lorry-driver, stricken while carrying out their accustomed tasks for the hundredth time, well founded?

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It is desirable to emphasise that only 12 (or 8%) claimed an isolated incident as the precipitating factor, and of these several were very doubtfully deserving of inclusion. In 90% there is no history of physical effort and in 28% there is a special accent on rest, for these were overtaken in bed or chair. It may be argued by those who favour effort as a major factor in ætiology that these figures are unconvincing, that the patient is unconscious, amnesic or of blunted perception and therefore unreliable as a witness, that he may have had a strenuous day before the attack developed and taking to his bed in exhaustion and weariness was there overcome. Or again, that while isolated strain plays little part, continued stress is highly suspect and that the enjoyment of quiet conditions at the time of rupture proves nothing. These points have been most carefully considered and in every case exhaustive inquiry has been made for collateral and corroborative evidence from relatives or associates. In almost every case the result has been a denial of unusual stress. For the contention of continued stress as a determinant, a necessary and inescapable corollary would seem to be a raised blood-pressure. But we find ourselves faced with the disconcerting and embarrassing findings in 63 of these cases in which there are blood-pressure readings. In 52 of these the systolic blood-pressure was found to be under 150 mm. Hg *and that at a time when with a raised intracranial pressure it would be expected to soar.* In only 7 cases was the diastolic blood-pressure over 100 mm. Hg. It seems a safe deduction that, however scanty our knowledge of the causes of rupture or leak, a raised blood-pressure is not one of them.

I suggest that the claim to the precipitating influence of stress and strain is weakened by these findings; but there is, I think, more convincing evidence to present, based on recurrence. Here we have the patient in most instances under conditions of our own choice, subject to more accurate observation and independent of the untutored accounts of lay witnesses no matter how reliable. Of 50 recurrences in this series, more than two-thirds happened while the patient was still in bed or had been allowed up under the quiet and controlled conditions of hospital life. The emphatic testimony against stress and strain in the production of the primary attack seems to be underlined by the observations on recurrences, and it seems logical to propound that if these factors play no part at the end they can also be exonerated at the beginning. Indeed, as between rest and effort this series suggests that the former deserves the greater share of blame.

SUMMARY

In a review of 150 cases of subarachnoid hæmorrhage it was found that the main incidence of aneurysmal rupture fell in early, or early middle, life; no reliable premonitory sign of aneurysm or its rupture could be specified but evidently headache of migrainous type in young people in whom no relevant family history is obtained should arouse suspicion; a concurrent ocular palsy would disperse a deal of doubt and would justify recourse to radiology. But in most cases the clinical picture was presented without warning or ceremony and the subject felled in the full enjoyment of his life.

Headache, sudden, severe and memorable was the introduction in the vast majority of cases and the association of pyrexia, vomiting and neck rigidity are often apt to cause misjudgment in favour of cerebrospinal meningitis. Convulsions were uncommon, and among objective signs papilloedema was unexpectedly rare (7%). Vascular hypertension was a negligible factor and in no case was a positive Wassermann or Kahn test found. It seemed quite clear that physical effort was unimportant in the ætiology.

The various symptoms and combinations of symptoms have been examined for prognostic indication but without any real success.

Autopsy was carried out in 58 cases; in 43 a ruptured aneurysm was found; in the remainder the hæmorrhage was definitely confined to the subarachnoid space but no aneurysm could be detected.

In this series there was a high incidence of aneurysmal dilatation on the right side of the circle of Willis, and on the anterior offshoots.

The gravity of the illness was reflected in the high mortality-rate (56%) and in the poor prospects of a really good recovery, which prospects diminished with advancing years. Not many of those examined subsequently were entirely free from symptoms, though these were often not a barrier to employment.

I am indebted to the Director-General of Medical Services, Ministry of Pensions, for his interest in the investigation and for his permission to publish this paper.

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DEPOSITION OF PROTEIN MATERIAL IN IMPLANTED PELLETS OF STEROID HORMONES

R. DEANESLY, D SC — A. S. PARKES, SC D CAMB, F R S

(*From the National Institute for Medical Research*)

CRYSTALLINE steroid hormones are now often administered by the subcutaneous implantation of pellets made by compression, according to the technique introduced by us in 1937. Certain local reactions follow the implantation of such foreign bodies. If a pellet is left undisturbed in the subcutaneous tissue for some time it becomes, in most cases, enclosed in a tight connective-tissue capsule which can usually be skinned off cleanly when the tablet is removed. The thickness of this capsule and the regularity with which it is formed vary with the species of animal, the substance implanted, the local conditions, and the duration of implantation. The extent to which the capsule prevents continued absorption is not yet clear: on the one hand, there is good evidence that tablets may be absorbed at a regular rate throughout their life (Thorn et al, 1939); on the other hand, there are reports that capsule formation may bring to an end the absorption of active material while much of the pellet still remains (Walter, Geist and Salmon 1940).

A fresh aspect of this problem was raised by Folley (1942a), who found that tablets of stilbœstrol which had been implanted for an appreciable time acquired, in addition to the connective-tissue capsule, an interstitial deposit of protein matter. This deposit could be demonstrated by removing, cleaning and drying a pellet, and immersing it in ether, whereupon the active substance dissolved and the residue floated to the top of the solution as a semitransparent or opaque body. The fact that the body had shape and coherence suggested that some definite process of deposition was involved, rather than the mere leaving behind of the dry matter of the body fluids which permeate the pellet. Folley reported that the deposit was in the superficial layers of the tablet only, so that after the removal of the stilbœstrol it took the form of a hollow envelope. The original observations related only to stilbœstrol and hexœstrol implanted into heifers, but Folley (private communication) has observed the same phenomenon with œstrone implanted into rats. Folley holds that the interstitial deposit progressively inhibits absorption, since he found that a tablet which has been removed, cleaned and re-implanted is absorbed more slowly on the second occasion (Folley 1942b). It should be emphasised, however, that in Deanesly and Parkes's original experiments pellets of androstanediol were still being actively absorbed after 13 successive implantations, removals and re-implantations, and that Emmens's (1939) very careful investigation of the rate of absorption of tablets of stilbœstrol esters showed that absorption, checked by periodic removal, proceeded steadily for the whole duration of the experiment—300 days.

Compressed tablets will inevitably have interstices capable of being filled with protein, and considerable interest, therefore, attaches to a recently introduced method of making pellets for implantation by fusing the active substance into solid blocks (Shimkin and White 1941). Such blocks should have no interstices and

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should therefore offer much less opportunity for the deposition of protein matter. Since fused blocks may ultimately succeed compressed tablets for implantation this possibility is of practical as well as of theoretical interest.

We have now examined the behaviour of fused blocks by comparison with that of compressed tablets, and made some further observations on the deposition of protein matter in implanted tablets.

OBSERVATIONS

Comparative absorption of tablets and blocks.—Four substances were used—œstradiol, testosterone, progesterone, and desoxycorticosterone acetate ('DOCA'). Tablets and blocks were made of approximately the same weight (50 mg.), and of as nearly as possible the same shape. In one series of experiments one rat was used for each substance, the tablet being implanted on the left side, and the block on the right. In several cases, after an initial period, usually 30 days, the tablets and blocks were removed, cleaned, dried, weighed and re-implanted into another rat for a further period. The results are shown in the table.

In the experiment with œstradiol, in the first experiment with testosterone, and in the 30-day experiments with progesterone and DOCA, the results with tablets and blocks were virtually identical. The differences between the other figures are not consistent, as they indicate a slightly faster absorption of progesterone in block form, and a faster absorption of testosterone and DOCA in tablet form. It may be provisionally concluded from these experiments that the rate of absorption of fused blocks is of the same order as that of compressed tablets.

Comparative deposition of protein in tablets and blocks.—The residual blocks and tablets from the experiments recorded above, after being cleaned, dried and weighed, were transferred to ether at room temperature, to dissolve away the active substance. As anticipated from the work of Folley, from each tablet a coherent ghostly* residue of the same size and shape as the tablet was left behind in the ether solution. This protein meshwork was particularly dense in the case of the œstradiol tablets. It seems, therefore, that tablets of œstradiol, testosterone, progesterone and desoxycorticosterone acetate must be added to the list of those which acquire an interstitial deposit of protein on implantation. In spite of this confirmatory result with compressed tablets, we were surprised to find that treatment of the fused blocks with ether led to a similar result, though in this case the body left behind after ether extraction was thin-walled and apparently hollow.

* Folley used the word "ghosts" to describe the bodies left behind when the active substance is dissolved away, but we hesitate to apply the word to bodies which can be examined by histological methods.

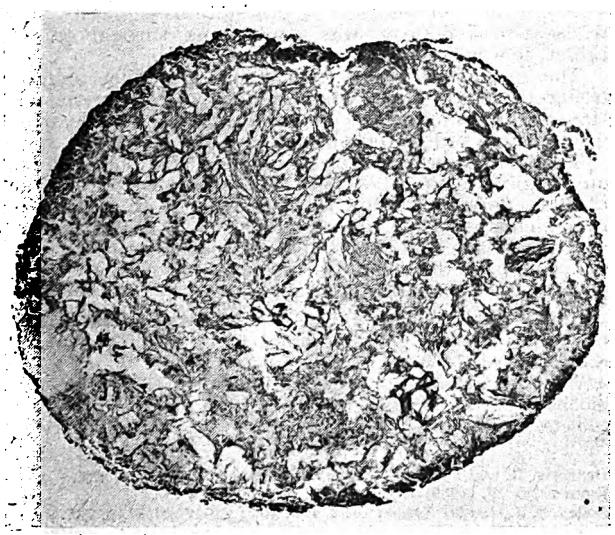

Fig. 1—Section of the protein deposit in a compressed tablet of desoxycorticosterone acetate. The tablet weighed 50 mg. on implantation, and 21 mg. when finally removed after 60 days. The deposit extends throughout the tablet. (× 18.)

COMPARATIVE RATE OF ABSORPTION OF COMPRESSED TABLETS AND FUSED BLOCKS

Substance	Nature of pellet	Duration of implantation (days)	Weight of pellet (mg.)		Absorption %
			Initial	When removed	
Œstradiol ..	Tablet	30	51	45	12
		60	51	39	23·5
		60	50	36	28
	Block	30	50	45	10
		60	50	37	26
Testosterone ..	Tablet	30	50	25	50
		60	50	10	80
		60	51	11	78
	Block	30	50	25	50
		60	50	9	82
		60	50	19	62
Progesterone ..	Tablet	30	50	36	28
		60	50	28	44
		15	50	43	14
		75	50	22	56
	Block	30	50	34	32
		60	50	15	70
DOCA ..	Tablet	30	50	42	16
		60	50	21	58
	Block	30	50	40	20
		60	51	38	25·5

The brace indicates two results obtained on the same pellet by removal and re-implantation.

Because of the further work described below it was impracticable to weigh the residual bodies, but it was evident that the deposits in the tablets were much more substantial than those in the blocks.

Histological examination of deposits.—The protein material was then examined histologically. From ether, the bodies were transferred to absolute alcohol, enough eosin being added to increase their visibility. They were then cleared in xylol, embedded in paraffin wax, sectioned, stained and mounted in the usual way. The material stained readily with hæmatoxylin, and the fact that it survived the histological treatment outlined above confirms Folley's conclusion that the interstitial deposit is largely protein in nature. On microscopic examination it was found that the residual bodies from the compressed tablets were solid in the sense that the meshwork of protein was continuous right through the tablet, and was remarkably even except for the greater density of the surface layer (fig. 1). The bodies from the fused blocks, on the other hand, consisted only of a thin envelope which appeared to have formed through the deposition of protein in the superficial interstices caused by absorption from the surface of the block (fig. 2). In one tablet of testosterone, where a small amount of the connective tissue capsule had been left on, histological examination showed small trabeculæ of fibrous tissue growing into what had probably been the superficial interstices of the tablet, but the cellular capsule was always quite distinct from the interstitial protein deposit (fig. 3). As histological material these specimens suffered from the facts that (*a*) with one exception, the connective-tissue capsule had been stripped off before the hormonal substance was dissolved away, so that the relation between the connective-tissue capsule and the interstitial meshwork could not be ascertained, and (*b*) the tablets, including their protein constituent, had been air-dried before the histological work was undertaken. We therefore made further histological observations on more adequately fixed material. A tablet of œstradiol trimethyl acetate, implanted for 150 days, was removed complete with connective-tissue capsule and fixed whole in Carnoy's fluid (60% absolute alcohol, 30% chloroform, 10% acetic acid), which was chosen for its penetrating power and to dissolve away the œstradiol compound. After

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fixation, the specimen was cleared, embedded and sectioned as usual. On microscopic examination the connective-tissue capsule was seen to be sharply defined and to have no obvious connexion with the interstitial deposit. The latter, in contrast to the capsule, appeared to have no cellular structure, and no evidence was obtained that it had ever included living tissue. This conclusion agrees with the fact that the connective-tissue capsule can be easily and completely stripped off the tablet when it is first removed from the animal so that no organic connexion between the capsule and the material deposited in the interstices of the tablet would be expected.

Deposition of protein in tablets made with excipient and after intraperitoneal implantation.—Experiments had been carried out in another connexion with 50 mg. tablets made of 60% stilbœstrol dipropionate, 39% lactose and 1% stearic acid, from which the lactose is very rapidly absorbed, leaving behind a highly porous mass. Such tablets were found to have a very substantial protein deposit. In a specimen examined microscopically after 20 days implantation, the meshwork was very thick and dense, while in similar ones implanted for 5 and 10 days the dried ether-insoluble material weighed about 2 mg. (7% of the weight of the tablet when removed). The rapidity with which the deposit is formed was also shown by the finding of a well-developed deposit in a 25 mg. stilbœstrol tablet implanted for only 5 days. The connective-tissue capsule takes several weeks to develop, and the presence of coherent deposits after even 5 days shows that the capsule is not necessary for their formation.

This conclusion was confirmed by examination of 25 mg. tablets of stilbœstrol after intraperitoneal implantation. Even after 5 days, when the tablets are still quite free in the peritoneal cavity, a well-developed deposit was found after extracting the tablets with ether. The meshwork may not be complete through the tablet in these early stages, but it is evident that the process of deposition is at work.

DISCUSSION

The weight of the pellet, cleaned and dried after removal from the animal, will include that of the interstitial protein, which according to Folley may amount to 2–3% of the tablet when removed, and the weight of the hormone itself will be correspondingly less than appears by the usual technique of estimation. The difference will be greater with compressed tablets than with fused blocks, and with the former, as Folley pointed out, may appreciably affect the calculation of the absorption-rate if only a small amount of active substance has been removed.

The experiments described show that the rate of absorption from a tablet with a complete protein deposit is roughly the same as that from a fused block in which it is only superficial. It is possible therefore that if both were free from protein a tablet might be absorbed more rapidly than a block, because its porosity would result in a much larger surface being presented for absorption than in the case of a fused block of the same weight.

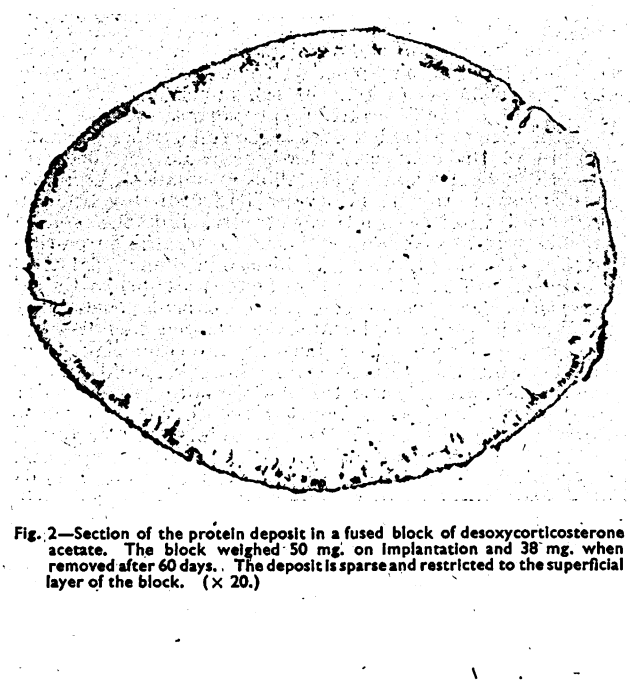

Fig. 2—Section of the protein deposit in a fused block of desoxycorticosterone acetate. The block weighed 50 mg. on implantation and 38 mg. when removed after 60 days. The deposit is sparse and restricted to the superficial layer of the block. (× 20.)

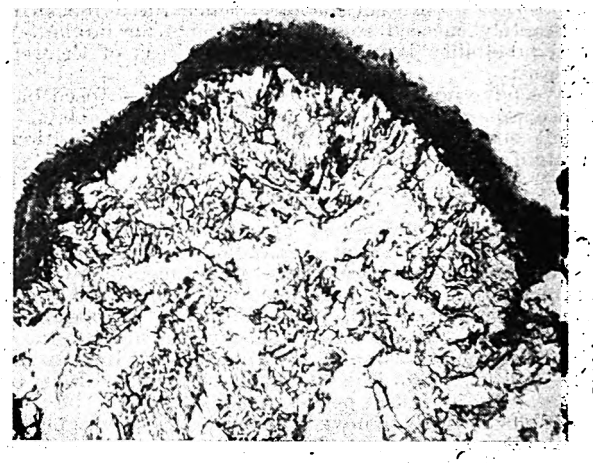

Fig 3.—Section of part of the connective-tissue capsule and interstitial deposit in a tablet of testosterone, implanted for 60 days. The capsule, composed of live tissue, is clearly demarcated from the interstitial deposit. (× 200.)

Even if the presence of the protein deposit slows down the absorption of the tablet, and to a lesser degree of the block, the figures given in the table offer no support to the view that the slowing down is progressive and that a pellet is more slowly absorbed in relation to its weight as time goes on. This conclusion is in keeping with evidence adduced above that the formation of the interstitial deposit, as distinct from that of the connective-tissue capsule, results from precipitation of the body fluids which soak into the tablet, rather than from a process of tissue growth, and becomes complete at a very early stage in the life of the tablet.

SUMMARY

In experiments with œstradiol, progesterone, testosterone and desoxycorticosterone acetate it was found that tablets made by compression were absorbed, after subcutaneous implantation, at about the same rate as blocks made by fusion.

Both types of pellet acquired an interstitial deposit of protein material as described for stilbœstrol tablets by Folley, but histological examination showed that, whereas the deposit was continuous throughout the tablet, it was superficial only in the block.

The meshwork showed no signs of having included living tissue or of having histological connexion with the sharply demarcated connective-tissue capsule which forms round implanted pellets.

The formation of the protein deposit is not dependent on the presence of the capsule, as is shown by the fact that it appears within a few days of implantation, before encapsulation takes place.

No evidence was obtained that the interstitial deposit of protein material slows up the absorption of the pellets.

Our thanks are due to Dr. S. J. Folley, with whom we have been able to discuss progress and exchange information during the course of the work.

We are indebted to Organon Laboratories for the fused blocks, and to Boots Pure Drug Co. for the stilbœstrol tablets.

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TRANSFUSION IN THE AMBULANCE

ITS VALUE IN THE WESTERN DESERT

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CAPTAIN RAMC; OC A FIELD TRANSFUSION UNIT

A WOUNDED man loses blood and blood-plasma at the time of wounding, and this loss may be so severe as to cause circulatory collapse, or "wound shock." But a second and scarcely less important factor with the severely wounded is the further loss of plasma into the damaged tissues produced by movement during evacuation. This second loss can be largely overcome by setting up "travelling transfusions" in ambulance cars.

In the Western Desert resuscitation work met some special problems. The distances between battlefield and field ambulances or casualty-clearing stations (CCSs) varied from 20 to 120 miles, and the tracks were very bad. They were the shortest route between two points. If the surface of a ploughed field could be hardened into concrete it would offer a fair imitation of long stretches of the main supply routes. Even tracks which had a good surface on the day they were marked out by the grader degenerated to the usual standard during three or four days of army usage.

Most of the battles along the North African coast were fought in areas where the water-supply was restricted to half a gallon per man per day for all purposes. This was sufficient to keep the forward troops in apparent good health, but was not always enough to maintain the water reserve on which the body depends to compensate for blood-loss, especially when the heat of the desert depleted the body fluids through endless perspiration. Wounded soldiers therefore were not so well able to compensate their blood-loss as their fellow casualties in a well-watered country.

Another factor which increased the degree of circulatory collapse was the widespread use of many types of mine and booby-trap by the enemy. These were employed on the most elaborate scale. They produce a unique type of injury in that detonation occurs in contact with the body, and often results in compound injuries of both lower limbs, associated with extensive surface laceration and the blasting open of the muscle layers, with much tissue destruction and hæmorrhage, while buttock and scrotal wounds are common. The resultant circulatory collapse is severe and these cases need considerable quantities of blood and plasma before operation can be undertaken.

TRANSFUSION OF CASUALTIES FROM BATTLES OF MARETH AND ENFIDAVILLE

—	Wounded in one corps area	% transfused	Fluid transfused per 100 casualties (bottles)		
			Blood	Plasma	Total
Mareth, March 16–25	1393	18	46	20	66
Enfidaville, April 29–May 5	820	12	23·5	9	32·5

(a) The unit of fluid in Eighth Army is the Bristol blood bottle, holding 540 c.cm. Each bottle of "blood" contains 100 c.cm. of 3·8% sodium citrate and 440 c.cm. of whole O (IV) blood.
(b) In both series, more whole blood was given in the main dressing-stations of field ambulances than in CCSs.

Further, wounds in desert warfare seem to be more severe than those received in less bare country. This is probably because of the lack of natural cover available for infantry attacking a defended position. At the Mareth battle, fought over typical desert country, approximately 18% of casualties received a transfusion in the forward areas (in field ambulances, or corps CCSs), whereas at Enfidaville, where the country is hilly and rock-strewn, despite fierce fighting, the proportion of casualities needing transfusion fell to 12%, while the number of bottles of blood and plasma used per 100 wounded fell from 66 to 33 (see table).

TRAVEL AND SHOCK

The transfusion equipment of Eighth Army units provided dry plasma for the regimental medical officer, dry and wet plasma or serum for the advanced dressing-stations, and plasma and blood for the main dressing-stations. Blood for the field ambulances, to which no transfusion unit was attached, was issued from the advanced blood bank, which was a mobile supply unit consisting of one refrigerator truck and one stores truck. Blood was sent out in ice-packed insulated boxes, holding up to 20 bottles each. In these it remained fit for use for a period up to 24 hours. An average of 1050 bottles of whole blood, and an equal amount of plasma, was supplied each month for the nine months September, 1942–May, 1943, to the Eighth Army, and of this a little more than half was used with field ambulances. Thus resuscitation was carried on in the most forward areas on a large scale.

During the summer months of 1942, before Alamein, all casualties passed through a single CCS, and it became clear that although it was possible to overcome a man's wound shock in a field ambulance, no guarantee could be given that circulatory embarrassment would not occur before he arrived at the next medical unit down the line. The following is a typical example:

CASE 1.—Sergeant, aged 25. At 08.30 hrs on July 15, 1942, injured by shell-burst (near miss) sustaining severe compound fracture of left femur, with extensive laceration of soft tissues. 10.15 hrs: admitted to main dressing station of field ambulance; circulatory collapse; pulse very rapid and difficult to feel; sweating and very restless; arms and legs cold. Morphia, gr. ¼, warm tea, and hot-water bottle given; plasma, 3 pints, intravenously. 17.30 hrs: warm; pulse 100, full volume; mouth moist. Leg in Thomas splint; comfortable. Evacuated: journey 25 miles on fair tracks. 23.30 hrs: Admitted CCS. Circulatory collapse; pulse could not be felt; severe pain in leg; great thirst; pale; profuse sweating; limbs and body cold; blood-pressure could not be registered from arm.

In these cases the circulation, though restored for the resting man, had not been able to withstand the extra strain of a 20-mile journey across the desert. It was most distressing, when doing the resuscitation work for the surgical teams, to receive these collapsed patients with penetrating abdominal and other severe wounds. They had already been revived once, but it was necessary to recommence resuscitation with a circulation which never responded a second time so rapidly or so fully as at first.

A month later, when severe casualties were evacuated with transfusion in progress in the ambulance cars, it was possible to take the patients out of the ambulances, confirm the satisfactory condition of the blood-pressure, perhaps start another bottle of blood—and the man was ready for the theatre. The following is a typical example taken from the records of seven such cases treated by the unit:

CASE 2.—Lance-bombardier, aged 21. At 12.00 hrs on Aug. 9, 1942, injured by land-mine; traumatic amputation of left arm above elbow, with severe blood-loss. 18.00 hrs: admitted to advanced dressing-station; 2 pints plasma given. 20.00 hrs; evacuated with 3rd pint plasma as travelling transfusion. 22.30 hrs; admitted to main dressing-station; condition satisfactory; pulse good, 112. Next day, at 10.30 hrs, condition still satisfactory; pulse 82. Evacuated with plasma transfusion; 28 miles over bad track. 14.00 hrs: admitted CCS, with transfusion. Condition very good; pulse 90; BP 120/70; colour good; thirst slight; warm; stump comfortable; needs sleep. 18.30 hrs: BP 130/80; evacuated to general hospital with travelling transfusion, 1 pint blood; 40 miles' journey, fair road surface. 21.45 hrs: admitted to general hospital; good colour; not sweating; pulse good, 96; BP 125/85.

Three of these cases had two journeys, the first without a travelling transfusion when the patient showed circulatory collapse at the end of the journey, and the second with a travelling transfusion, when the condition on arrival was good. The following is quoted as an example:

CASE 3.—Staff-sergeant, aged 37. At 07.45 hrs on Sept. 20, 1942, his face was severely damaged by a shell-burst, with lacerating injuries of upper lip, nose, and both eyes 09.45 hrs: admitted to field ambulance; has had much hæmorrhage; pulse poor, 110. 10.00 hrs: serum, 2 pints morphine gr. ½; breathing without obstruction. 11.30 hrs: condition satisfactory; pulse 90; evacuated. 14.40 hrs: admitted to CCS; pulse 108, weak; hands cold; restless; thirsty; BP 80/40; pain marked. 14.50 hrs: blood started; morphine, gr. ¼. 15.15 hrs: blood, 2 pints; warmer; pulse better volume. 16.15 hrs: blood, 3rd pint. BP

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100/60; pulse 90; condition satisfactory. 17.00 hrs: evacuated to maxillofacial unit, with travelling transfusion; 20.45 hrs: admitted MFU; condition good; pulse 86, good volume; no pain; skin slightly moist. No circulatory collapse. Transfusion running well.

Experiments and trials have shown that the evacuation of casualties with transfusions in progress is a reasonable possibility, and greatly reduces circulatory collapse. Other benefits which seemed likely to accrue included the following:

1. A regimental medical officer in the desert could treat a severe or moribund casualty by setting up a plasma transfusion in the ambulance, and evacuate the case immediately with a reasonable expectation of the patient reaching a more extensive resuscitation centre alive.
2. Field ambulances, when ordered to move, or when overcrowded could pass even the worst cases down the line with transfusion in progress.
3. Cases in urgent need of surgery—particularly abdominal and chest wounds, maxillofacial injuries and burns—could be evacuated by forward units to field surgical units without waiting for the full restoration of the circulation which would otherwise have been necessary.

With abdominal wounds the initial shock is often severe, the adverse effect of travel is greater than in any other type of case, and the need for surgery is most urgent. A fact perhaps not widely recognised is that however serious may be the effect of movement before operation, it is much worse in the 6 or 7 postoperative days.

For example, two CCSs during the Mareth battle worked side by side within half a mile of each other, 20 miles behind the line. When the line had moved forward, one CCS was ordered to move, and had to pass on to the other unit the cases which it had been holding. Seven penetrating wounds of the abdomen, all 4–7 days old, were considered to be progressing satisfactorily, and were transferred the distance of half a mile in ambulance cars with the greatest possible care. Four of these patients died within 24 hours.

Recognition of these facts led to a standard technique in the desert, by which almost all abdominal injuries were treated. Wherever possible they were resuscitated with whole blood and operated on in selected forward field ambulances, to which surgical and transfusion units were attached. They were held and nursed in the field ambulance for 6–10 days, and in the event of the unit being ordered to move without being relieved by another unit, a detachment was left to care for them. It was the universal practice to employ continuous gastric suction and intravenous saline during the immediate post-anæsthetic period, and for 4–7 days afterwards. A recent analysis of 1000 casualties shows that the average post-operative consumption of glucose-saline in those abdominal cases surviving operation by more than 24 hours was 17·6 pints from the time of operation to the time when fluids could again be taken by mouth.

Burns cases, of which the proportion in the desert was for various reasons abnormally high, probably come second to abdominal wounds in their poor response to travel. Generous administration of plasma or serum is accepted as beneficial. Whenever possible, this was continued during successive journeys to the forward base in the ambulance cars.

Penetrating chest wounds, though not usually in need of extensive transfusion, also travel very badly, and soon show shock. Travelling transfusions overcome this difficulty and should be used as a routine for such injuries.

Maxillofacial injuries often develop a degree of shock out of all proportion to blood-loss and tissue damage. They require the early attention of a special unit with its trained operating team, special anæsthetics and instruments, and high-grade nursing facilities. The problem is to place them in the hands of this unit at the earliest possible moment, and this can be best achieved by the use of blood-transfusion during evacuation.

TECHNIQUE

In devising technique, the following points have to be considered:

1. Ease and rapidity of employment.
2. Only equipment available in all medical units to be used.
3. Absence of discomfort for the patient.
4. Absence of possible complications.

The following technique applies to the Mark IV, four-berth, K.2 ambulance car, which is the best type in use:

The transfusion is set up in the normal manner in the ward-tent or penthouse, with special attention to certain details.

The splinting of the arm must include a firm bandage across the palm to prevent any possibility of pronation of the forearm, which would lead to flexion at the elbow and displacement of the needle. The needle must be placed truly into the lumen of the vein selected, and then along the vein for half an inch. When the set has started running satisfactorily the needle union and the surrounding skin are "fixed" with a four-inch length of 3-inch 'Elastoplast.' It is rarely necessary to employ a cannula, even in the worst cases of shock, and its use in the desert is discouraged because it is difficult to obtain sterile conditions, and because all possible veins should be left for later intravenous therapy. It is important not to fix the arm in a straight splint, for this gives rise to discomfort owing to hyperextension. It is recommended that a piece of 10 cm. Cramer wire should be bent to an angle of 10° at its mid-point, and enclosed in a plaster-of-paris slab to provide rigidity.

A number of pieces of 4-inch cotton bandage are now attached to the giving set in the following manner. A piece 18 in. long is looped through the wire bottle-suspender and allowed to hang loosely. Three pieces, each 36 in. long, are tied firmly to the neck of the bottle (the lower end) and one piece 30 in. long is tied to the lower end of the drip-counter. The patient's documents are now tied to him, gr. ¼ morphine is administered, and he is carried out to the ambulance with an orderly carrying the bottle. The stretcher is placed on the lower bunk, on the side which permits the patient's transfusion arm to be on the "inboard" side of the stretcher. The orderly carrying the bottle immediately ties the suspender to the forward ventilator in the roof of the ambulance with the 18-inch piece of bandage provided. The three lengths tied to the neck of the bottle are used as stays, two being fixed firmly to the hand-grips just below the roof on the sides of the ambulance, and the third tied tightly to the latch of the door at the forward end of the compartment leading to the driver's cab. The bottle is in this way held rigidly in position, a situation which is found to be much better than any "free" or "elastic" suspension method. The drip-counter must now be fixed, and for this purpose a full two-gallon petrol or water can, such as all ambulances carry, needs to be placed immediately below the set on the floor. The bandage from the drip-counter is tied tightly to the handle of the can, and the set is complete.

A medical orderly travels with the patient, as variations in the roughness of the road or track alter the rate of flow and necessitate adjustment of the drip. If the journey is likely to be a long one, a spare bottle of blood or plasma is sent to enable the transfusion to be continued.

On paper, this method may sound cumbersome and complicated, but in practice any intelligent orderly can be taught to set it up in half an hour. Two transfusions can be set up side by side suspended from the ventilator for two patients in the lower bunks. The technique, with very little modification, has been applied successfully both in ambulance planes and hospital ships. In the course of the ten months from August, 1942, to May, 1943, it is estimated that 200 casualties have been evacuated in this manner. It has been found unnecessary to modify the technique, but a holder has now been devised to take the place of the bandages and petrol tin. The advantages of the original method was that all medical units were equipped to employ it immediately. It has now proved itself sufficiently to justify the provision of a standard holder in all ambulance cars of this type.

RESULTS

No case has been traced in which a patient with a travelling transfusion in progress has arrived at a medical unit in a state of shock. Before the battle of Alamein, when lines of communication were short, it was possible to follow a number of these cases from one medical unit to the next. The blood-pressure was maintained for the whole journey at its initial level, and in 2 cases, the systolic BP had risen by 10 mm. Hg. The failures (where the bottle had emptied before the end of the

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journey and where the transfusion had stopped running) have been due to the absence of an orderly, so that the flow had not been adjusted during the journey.

SUMMARY

1. The average severity of wounds and the degree of wound shock are apt to be unusually great in desert warfare.

2. This view is borne out by figures showing the average amounts of blood and plasma given in two periods of severe fighting, in desert and in hill country.

3. The harmful effect of an ambulance journey on an already embarrassed or recently resuscitated circulation is emphasised.

4. A technique has been elaborated in the Western Desert whereby it has been possible to evacuate 200 casualties by ambulance with a transfusion of blood or plasma in progress.

My thanks are due to Brigadier J. Walker, late DDMS Eighth Army, and to Lieut.-Colonel G. A. H. Buttle, adviser in blood transfusion, MEF, for their constant encouragement in these experiments, and to all transfusion officers in Eighth Army, whose help and suggestions enabled the travelling transfusion to become a reality.

EHRLICH'S MEGALOBLASTS

ASSOCIATED WITH LOW MEAN CORPUSCULAR VOLUME AND RED CELL DIAMETER

HENRY FOY, MA OXFD
DIRECTOR OF THE WELLCOME TRUST RESEARCH LABORATORIES, THESSALONIKI

ATHENA KONDI, MD
CLINICAL RESEARCH WORKER

(*From the Wellcome Trust Research Laboratories, and South African Institute for Medical Research, Johannesburg*)

DURING the course of a nutritional anæmia survey in the Bechuanaland Protectorate, Africa, we came across a case of chronic untreated amœbic dysentery in a 9 months' pregnant negress, who had been suffering from persistent diarrhœa for the whole of her pregnancy.

The bone-marrow on examination was found to contain typical Ehrlich's megaloblasts, exactly similar to those in the nutritional macrocytic anæmias of India (Wills 1932) and Macedonia (Fairley et al. 1938, Foy and Kondi 1939) and in untreated cases of pernicious anæmia.

The megaloblasts found in this case are not to be confused with the megaloblasts of the American workers (Sabin 1921, Doan et al. 1925). The cells we describe here are the typical Ehrlich's megaloblasts, with fine network open nuclei, and smooth hæmoglobinised cytoplasm described by Turnbull (1936), Schulten (1937) and Israëls (1939b). They are characteristic of pernicious anæmia and of the nutritional macrocytic anæmia of India and Macedonia. Our wide experience of these cells, which were first introduced to us by Dr. Lucy Wills, as being similar to her Indian ones, leaves no room for doubt as to their existence in the present case. In addition to these there were also present in the bone-marrow pathological white cells—the typical giant *stab*-cells (*Riesen-Stabkern* of Schulten)—which are also characteristic of both pernicious anæmia and nutritional macrocytic anæmia of Macedonia (Foy and Kondi 1939).

Jones (1937), Tempka and Braun (1932), and Dameshek and Valentine (1937) have given excellent accounts of these cells, and the last state that whatever deficiency is responsible for abnormal maturation of the red cells also affects white-cell maturation, with production of bizarre forms of "metamyelocytes" (giant *stab*-cells). These, they consider, may give rise to the hypersegmented polymorphs found in the peripheral blood of many, if not all, macrocytic anæmias.

Giant *stab*-cells are typically 18μ to 32μ in diameter, and contain large U-shaped nuclei, coarsely netted and porous in appearance. There may be chromatin condensation in the nucleus but there is never any pyknosis. The cytoplasm is much more immature than the nucleus, finely or coarsely granular, and weakly basophilic when stained in Leishman and Giemsa and buffered with water at pH 6·8. In our opinion these cells are just as characteristic of the macrocytic anæmias as are the megaloblasts of Ehrlich, and we have found them not only in pernicious anæmia, but also in tropical sprue, and the nutritional macrocytic anæmias reported from Macedonia. It is interesting to note that the deficiency responsible for the production of these abnormal red and white cells affects the two series differently: in the red-cell series resulting in the megaloblast, with mature cytoplasm and immature nucleus; in the white-cell series in the giant *stab*-cell, with immature cytoplasm and a mature nucleus.

The presence of Ehrlich megaloblasts in association with normal mean corpuscular diameters, volumes and thicknesses, raises the question of their ultimate fate.

Bock and Malámos (1939), Jones (1937), Fieschi (1938) and Naegeli (1935) state that in their opinion these megaloblasts are present in the marrow of pernicious anæmia and give rise, after treatment with liver, to the megalocytes found in the peripheral blood. If this view is correct, then the term "megalocytic anæmia" should be used to define large-cell anæmias occurring in conjunction with megaloblasts in the marrow. On the other hand Schulten (1937), Doan (1938), Henning (1936) and Schartum-Hansen (1937) consider that the megaloblasts in the marrow are transformed, after treatment, into normal-size red cells. Israëls (1939a) believes that megaloblasts occur in the marrow of all "PA-factor deficient anæmias" and that all such anæmias are megalocytic, but that not all large-cell anæmias have megaloblasts in the marrow.

The present case seems to indicate that megaloblasts can occur in the marrow without giving rise to a megalocytic anæmia. Precisely how this can happen is not clear. It is possible that we may have caught this case at such an early stage that although megaloblasts were present in the marrow sufficient time had not elapsed for the production of a megalocytic blood-picture, though this view would be difficult to fit in with the low blood-count. Or perhaps the exit of these large cells from the marrow was hindered in some unknown way, analogous to that operating in pernicious anæmia, where leucopenia is associated with a hyperplastic marrow. If, as some claim, marrow megaloblasts are converted after liver treatment into normal-size red cells, then other things besides liver might facilitate this maturation of megaloblasts—just as thyroid does in myxœdema. Probably the antipernicious-anæmia factor exerts its effects somewhere at the pro-erythroblast stage, thus preventing the formation of megaloblasts and pushing the cell maturation along normal lines. None of these explanations accounts for the large-cell anæmias which occur in the absence of megaloblasts in the marrow.

The interest of the present case is that megaloblasts and giant *stab*-cells were found in association with a mean corpuscular volume (MCV) of 69μ^3, and a mean red-cell diameter of 6·75μ as shown by Price-Jones curve (see figure).

CASE-HISTORY

The woman was brought to us suffering from weakness and anæmia, and with a history of 9 months continuous diarrhœa. She was emaciated, about 30 years old, and 9 months pregnant. She had a palpable and tender liver; spleen not felt. There was no glossitis, though the gums showed the blotchy hæmorrhages common among these natives. Her teeth were very bad, and her gums soggy. Her skin was dry and cheeks sunken. Reflexes were normal; there was no sign of an icteric tinge in the whites of her eyes. There was no history of nose-bleeding or chronic hæmorrhages. Her temperature and pulse-rate were normal. We did a hæmatological examination on May 28, 1942, with the following results: red cells 2,627,000 (± 3%) per c.mm.; Hb. 7%; colour-index 0·92; white cells 3440; hæmatocrit 18%; MCV 69μ^3; reticulocytes 0·5%; hæmobilirubin 0·6 mg. %; mean corpuscular average thickness 1·9μ; mean corpuscular Hb. = 26·9γγ; mean corpuscular concentration 38·9%. A marrow biopsy done at the same time showed a very active marrow, containing typical Ehrlich's megaloblasts, giant *stab*-cells, and early and late erythroblasts. No malaria parasites were found; there is hardly any malaria in this area where the spleen rate is about 0·5%. A fæcal examination showed abundant *Amœba histolytica* cysts.

We were unable to follow up the case or to do a gastric test, but have since heard that the woman made an

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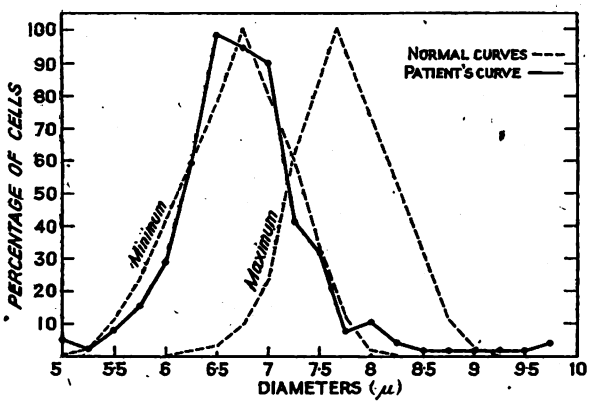
uneventful recovery after having emetine injections, and giving birth to a live child. This history rules out pernicious anæmia.

REVIEW OF METHODS

Our first reaction to the finding of megaloblasts in the marrow, associated with such hæmatological findings, was that our hæmatocrit value had gone astray. We therefore repeated the examination, getting the same results. In addition we carried out an examination using exactly similar methods on a known normal Bechuana native and found the marrow normal in



Price-Jones curve.—Arithmetic mean 6·75; standard deviation 0·658; coefficient of variation 9·7%.

every respect and the blood as follows: red cells 5,700,000 (± 3%)[1]; Hb. 14·5%; CI 1·0; hæmatocrit 46·6%; MCV 80 μ^3; MCHb. 25·4 $\gamma\gamma$; MCHb. concentration 31·5%; reticulocytes 0·3%; hæmobilirubin 0·4 mg.%.

The red cells were counted in standardised pipettes and chambers, and a thousand cells counted, thus stabilising the error at ± 3% (Ponder 1934). It will be noticed that the red-cell diameters as ascertained by Price-Jones curve (see figure) were in harmony with the MCV as calculated from the hæmatocrit. The slide for the Price-Jones curve was taken from peripheral blood, and after drying in air was immediately fixed in Leishman for 1 minute, dried and immediately counter-stained in 1% aqueous eosin for 1 minute. This is the standard method used for all our curves, and is the one recommended by Price-Jones (1936). If such methods are always adopted then any change in cell diameters are constant. The hæmoglobin was done by the standard method of Newcomer using a Duboscq colorimeter.

DISCUSSION

This is the first time we have seen Ehrlich's megaloblasts associated with anything but macrocytic anæmias. Other authors have described such cells in cases of chronic diarrhœa and prostatitis, but none so far as we are aware has given the hæmatological findings associated with them. Our case emphasises that one should not rely on a single index in diagnosing macrocytic anæmias. For the diagnosis of such anæmias we regard as essential: a mean corpuscular volume of above 100 μ^3 *taken at low reticulocyte level;* a colour-index above 1·0 based on hæmoglobin estimated by some reliable method; the presence of Ehrlich's megaloblasts and *stab*-cells in the bone-marrow; and response to a known potent liver preparation. We have seen many papers describing macrocytic anæmias diagnosed on only one of the above criteria. In particular it is common to find diagnoses made on mean corpuscular volumes alone, with no mention of the percentage of reticulocytosis, which can itself give a macrocytosis. Diagnoses are also quite commonly made on sternal-puncture findings only, the danger of which is illustrated in the present case. The increasing popularity of sternal punctures may lead to confusion among workers not fully aware of the difficulties of identifying megaloblasts, and of the importance of proper staining methods and differentiation; in many parts of the world we have seen diagnoses made on marrow smears in which it was impossible to identify anything with certainty on account of faulty staining. A further cause of confusion which we have constantly met with is the failure to differentiate between early erythroblasts, and the megaloblasts of Ehrlich—a state worse confounded by some American authors who call erythroblasts megaloblasts, and of some English textbooks on hæmatology, which refer to the hæmocytoblasts of Vaughan, Turnbull, and others, as megaloblasts. Vaughan has given an excellent account of this confusion in her textbook which should be consulted.

It will be noticed from the figure that there is little anisocytosis in the present case, the coefficient of variation being 9·7%. Probably in this case the long-continued diarrhœa, by preventing the absorption of substances necessary for hæmopoiesis, was the factor behind the hæmopoietic failure.

We wish to thank Dr. Bernard Squires of the Bechuanaland Medical Service for putting us into contact with this case; and Miss Hales of the London Missionary Society for her help. Our thanks are also due to the Principal Medical Officer of Bechuanaland.

1. The altitude of this Native Reserve is about 3500 feet.

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POSTERIOR SUBASTRAGALOID ARTHRODESIS IN FRACTURED OS CALCIS

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FRACTURES of the os calcis now occupy the place once held by adduction fractures of the neck of the femur. Many surgeons have become so dissatisfied with the results of treatment by the recognised methods that they advocate and practise measures which, in effect, consist of ignoring the fracture and treating the patient, and in certain types of these injuries their results are certainly no worse than those produced by treatment in accordance with the accepted principles of reduction followed by immobilisation until firm bony union has occurred.

All types of os calcis fracture are not equally crippling. Generally speaking the ultimate function is much better if the subastragaloid joints are not directly involved in the fracture. When these joints are directly involved it appears to me that any treatment which does not include an immediate arthrodesis of the affected joint is futile. As with any other weight-bearing joint reduction of a fracture involving the articular surface must be absolutely accurate to be effective, and any persisting irregularity will produce subsequent arthritis. The usual methods of traction and lateral compression produce, at best, only an approximately accurate reduction. The articular surface of the os calcis remains irregular, and the articular cartilage of the os calcis and astragalus is contused and crushed. Not only is subsequent arthritis inevitable, but, as joint movement under any circumstances is prevented in the early stages by pain, intra-articular adhesions produced by organising blood-clot become well established. These changes must occur with any form of conservative treatment, although the use of a transfixion pin, with a subsequent low-grade infection of the pin track spreading to the

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posterior subastragaloid joint, often adds yet another factor to the permanent disorganisation of this joint.

Wilson in 1933 suggested that subastragaloid arthrodesis was indicated in fractures of the os calcis in which the subastragaloid joints were involved, and, more recently, Bankart (1942) has advised immediate subastragaloid arthrodesis together with calcaneo-cuboid arthrodesis, excision of the scaphoid, and astragalo-cuneiform arthrodesis in all such injuries.

While it seems certain that damage to the subastragaloid joints is the dominating factor in producing disability after such injuries, it is also certain that the posterior subastragaloid joint alone bears the brunt of the damage in most fractures. This joint is directly involved in 45% of all fractures of the os calcis, while the anterior subastragaloid joints are only involved in 10% of all fractures (Watson-Jones 1941). It is illogical to perform a sweeping arthrodesis, extending far beyond the limits of the original injury, if as good or better results can be produced by simpler procedures.

A technique for a localised arthrodesis of the posterior subastragaloid joint has been described by Campbell (1939). The joint is exposed by a small incision and the articular cartilage is removed from the os calcis and astragalus. This produces a gap which is filled with bone chips from the lateral surface of the os calcis. The method has several disadvantages. The bone available from the os calcis is limited in amount and of a low osteogenic value, and the gap between the os calcis and the astragalus must be completely filled if bony ankylosis is to be rapid and certain. Moreover, as Creer (1943) has pointed out, normal relationship between the astragalus and the os calcis as a whole must be restored to prevent distortion of the midtarsal joint, and this entails complete replacement of the bone removed. Further, after operation on these lines the joint is unstable, and it is difficult to control tilting of the os calcis and prevent recurrence of a valgus deformity of the heel by immobilisation in plaster. This instability also precludes early weight-bearing, which is so important in preventing disuse atrophy and stiffness of the foot, because of pain and the danger of re-displacement in plaster.

I have found a technique consisting of a combination of removal of the articular cartilage and the introduction of a stout autogenous graft across the fracture and joint surfaces much more satisfactory. This operation produces a mechanically stable arthrodesis which is painless, not liable to re-displacement, and permits early weight-bearing. The presence of the graft and the effective immobilisation produced by a combination of internal and external fixation promotes rapid and complete bony union.

4
Fracture 9 weeks after operation.

1
Chisel in position at operation.

2
Graft in position at operation.

3
Graft cut. Packing of joint completed.

TECHNIQUE OF OPERATION

Operation should be carried out as soon as possible after injury, but, because of bruising and swelling, between one and three weeks preliminary treatment is usually necessary.

A tourniquet is used and sterile stockingette is applied from the toes to the knee. The posterior subastragaloid joint is exposed by a two-inch incision curving forward from the tip of the external malleolus. The peroneal tendons are mobilised, retracted downwards, and the joint capsule is divided in the line of the skin incision. The joint is opened up by tilting the heel medialward, when surprisingly extensive damage to the articular cartilage of both os calcis and astragalus is usually observed. Using a thin chisel the cartilage is completely removed from both bones, together with sufficient bone from the medial half of the joint to correct any valgus deformity of the heel. A second short incision is made over the anterior aspect of the neck of the astragalus, which is exposed by separating the tendons of tibialis anterior and extensor hallucis longus. The limits of the tibial and scaphoid articular surfaces are defined, and, while the foot is steadied by an assistant who holds the os calcis in normal relationship to the astragalus, two drill holes are made in the centre of the long axis of the neck with a $\frac{1}{16}$ inch drill, which is directed towards the centre of the lower border of the tuberosity of the os calcis. A chisel with a $\frac{3}{4}$ inch blade of uniform thickness is driven through the neck of the astragalus in the same line, joining the drill holes. The chisel crosses the posterior subastragaloid joint, enters the os calcis, crosses the fracture, and is driven home until it approaches the limits of this bone. Its position is then checked by radiography.

Several points are important during this stage of the operation. The preliminary drill holes, which prevent the chisel splitting the neck of the astragalus, should not be omitted, and the scaphoid and tibial articular surfaces must be seen and avoided. Care must be taken to prevent valgus tilting of the os calcis as the chisel is inserted.

An incision is now made over the subcutaneous surface of the tibia, and a graft the exact width of the chisel blade and about $4\frac{1}{2}$ inches long is cut with a double saw. The loose cancellus bone is removed from the deep surface of the graft and is packed into the posterior subastragaloid joint around the chisel blade. The graft is smoothed and shaped a little with a file so that it can be driven along the chisel track easily. The chisel is then freed with a few gentle taps with a mallet, withdrawn, and the graft is driven home along its track. After its position has been checked by radiography the protruding portion is cut off flush with the neck of the astragalus and is used to complete the packing of the joint. The incisions are closed, and the leg is immobilised in a well-padded plaster extending from the metatarsal heads to the knee.

Figs. 1 and 2 show the chisel and graft in position in a typical comminuted fracture of the os calcis involving the posterior subastragaloid joint, and fig. 3 shows the position after the graft has been cut and packing of the joint completed.

Two weeks after operation an unpadded plaster with a 'Sorbo' rubber heel is applied and weight-bearing is begun. Care should be taken to ensure that the patient walks with a normal heel and toe gait, and toe and knee exercises are

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carried out regularly. Weight-bearing in plaster is continued until there is clinical and radiological evidence of firm ankylosis of the joint and union of the fracture. This occurs surprisingly quickly—for example, fig. 4 shows a fracture nine weeks after operation. When ankylosis is firm plaster is discarded and the patient is instructed in exercises to restore full movement to the midtársal and ankle-joints. At this stage a few weeks treatment at an organised rehabilitation centre, where the necessary exercises and a graded return to full activity can be carried out under expert supervision and in a stimulating environment, is of great benefit to the patient.

This procedure, which in my hands has produced encouraging results, is a logical method of treatment for that 45% of all fractures of the os calcis in which the posterior subastragalcid joint is directly involved. The introduction of a graft immobilises both joint and fracture, bony ankylosis and union are rapid, and the mechanical stability produced makes possible the early weight-bearing which is important in preventing a disuse atrophy of the foot with all its crippling sequelæ. Ankylosis of the posterior subastragaloid joint in neutral position in no way interferes with the efficiency of the foot as a whole, and prevents the occurrence of that potent source of disability, arthritis of a joint through which the whole body-weight is transmitted at every step.

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CONGENITAL CYST OF THE LARYNX

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NON-NEOPLASTIC cysts in the larynx are usually classified into three types: mucous-retention cysts; hæmorrhagic cysts; and congenital cysts. Congenital cysts are rare. They may manifest themselves at birth or give rise to no symptoms until adult life, when it becomes difficult to establish their congenital origin. Those which cause symptoms at birth are commonly fatal if not promptly recognised, but cure has been reported by simple aspiration.

Only 15 cases of the condition in infants have been reported since Edis (1876) presented the first and most of these have been identified only at autopsy. Another case is recorded here. Jacobi and Rascoff reviewed the cases published up to 1935 and emphasised that the condition should be borne in mind in the differential diagnosis of laryngeal stridor in infancy. Since then Snaith (1940) has reported a further case.

CASE-HISTORY

A male first child was born of healthy parents on May 20, 1941. The pregnancy was normal; confinement lasted 18 hours and delivery was easy and spontaneous. The child weighed 8 lb. 12 oz. at birth and looked healthy and of normal colour. It did not cry, however, and respirations were slow to start. Gentle artificial respiration was performed and shallow irregular breathing started, but it sounded as if some laryngeal spasm were present. Air was next blown gently into the trachea through a mucus extractor. An injection of adrenaline, and later one of atropine were given and carbon dioxide and oxygen administered at intervals. Respiration remained shallow. About 5 hours after birth considerable cyanosis developed with respiratory distress, particularly severe when the bowels were moving; 12 hours after birth, no improvement being noticed, the child was transferred to the Aberdeen Maternity Hospital at 8.30 PM on May 20. On admission breathing was distressed and oxygen was administered by Gibberd's apparatus. Difficulty in breathing persisted and was often accompanied by cyanosis and stridor. It was aggravated during feeds and resort to catheter feeding was eventually necessary. Extension of the head appeared to give some relief. The child throughout its life made vigorous respiratory efforts and all the accessory muscles of respiration were brought into play. No masses were felt in neck or abdomen. X-ray examination showed no abnormality or tumour masses in the neck. The heart and lungs were clear. On June 14 the temperature rose sharply to 101° F. and next day the child died.

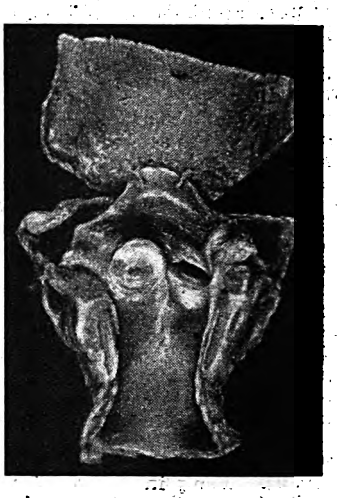

Fig. 1—Larynx opened from behind; cyst in left wall. (x 1·25)

At autopsy the body was that of a well-developed male infant weighing 7 lb. 6 oz. Aeration of the lungs was limited to the anterior and inferior borders, the remainder being atelectatic and somewhat congested; no pneumonic consolidation was present. All the other organs were healthy with the exception of the larynx, the orifice of which was almost completely occluded by a tense semitranslucent hemispherical cystic swelling 5 mm. in diameter, situated on the left wall at the level of the laryngeal ventricle (fig. 1). A horizontal thickened band crossing the lower part of the swelling was believed to represent the true vocal cord. The upper boundary of the cyst was sharply defined. The false cord was arched tightly over the superior margin and was separated from it by a shallow slit representing all that remained of the ventricle of the larynx (fig. 2). The right side of the larynx showed no abnormality. Coronal section demonstrated an extension of the cyst forward along the posteromedial surface of the thyroid cartilage. The contents of the cavity were mucoid. No communication was demonstrated at any point between the lumen of the cyst and that of the larynx. No other congenital abnormalities were present.

Histology.—Half the larynx, including the cyst, was cut in interrupted serial sections. The cyst and the fissure immediately below the false cord were found to be lined by ciliated columnar epithelium, and there was no aperture between them. The wall of the cyst was composed of dense laminated acellular fibrous tissue with the addition of a small bundle of muscle-fibres, cut transversely, at the site of the true vocal cord. In the wall of the forward extension of the cyst there were a few compressed mucous glands. No recognisable inflammatory changes were present in relation to the cyst and no lymphoid tissue was present in its walls.

DISCUSSION

Congenital cysts of the larynx manifesting themselves in infancy have been described in various situations: in the laryngeal ventricle; on the epiglottis; in the aryteno-epiglottic fold; and in the pyriform fossa. The earlier writers made no attempt to explain their ætiology, but German cases reported by Salomon (1910), Schneider (1912), Pünder (1918) and Stoerck (1916) help to throw some light on the condition. In all these cases the cysts bore a close relation to the laryngeal ventricle and were lined by columnar ciliated epithelium; some contained a nodule of cartilage in the wall. Schneider, who made serial sections of Salomon's case, concluded that the cysts arose by a snaring off of a group of cells which should normally have taken part in the formation of the ventricle but which grew independently and formed a cyst (after the manner of inclusion epidermoid cysts of the skin). Stoerck admits this as one possibility but not as the only explanation. The presence of the nodule of cartilage in the wall of the cyst led him to believe that the cyst might have arisen as the result of differential growth of a group of multipotent cells; in other words that it might be a teratomatous formation. A branchiogenic origin was upheld by Louys (1899), describing an adult case. Jacobi and Rascoff (1935) also considered that one of their cases was of branchiogenic origin in the location of the second cleft. Snaith (1940) interpreted his case as a simple mucus retention cyst.

The difference in situation of the cysts must be considered in interpreting their mode of origin, and it is likely that they are not all of the same nature. In the case of cysts of the laryngeal ventricle, however, which is the only type I have encountered, it seems probable that the ætiology can be explained simply by reference

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to the development of the larynx as described by Keibel and Mall (1912). The anlage of the ventricle appears in embryos of 24 mm. as a solid epithelial bud. This bud acquires an independent lumen about the 3rd month of intra-uterine life, and so forms a vesicle connected with the lumen of the larynx by a solid epithelial cord. The lumina of the vesicle and the larynx are later joined by hollowing of this cord. If this hollowing process were incomplete the vesicle would remain unconnected with the larynx and could by progressive growth give rise to a cyst lined by ciliated columnar epithelium. By accumulation of secretion and progressive enlargement the cyst would protrude into the larynx. I would regard the cyst as the result of a simple atresia of the orifice of the laryngeal ventricle, and thus as an example of a process commonly encountered as a cause of congenital abnormalities. Such a process is met with in atresia of the œsophagus, of the duodenum, and of the bile-ducts.

The conditions from which congenital cysts of the larynx in infancy have to be differentiated are congenital laryngeal stridor, extralaryngeal conditions such as enlarged thymus, and cerebral hæmorrhage. The presence of a cyst rather than a cerebral hæmorrhage is indicated by the vigorous respiratory efforts made by the child to overcome the dyspnœa, and by the presence of stridor. X-ray examination may help in detecting extralaryngeal conditions. A cyst can be distinguished from congenital laryngeal stridor by the fact that the child with a cyst is in real distress and that the symptoms are aggravated by feeding, defæcation, and any action in which the glottis is closed. Some relief is obtained if the head is held extended or turned to one side and the child will possibly find this position for itself. All the accessory muscles of respiration are brought into play to try and overcome the obstruction to breathing. At any time suffocation may ensue. If the condition is borne in mind laryngoscopy will usually reveal the cyst, and Pünder (1918) considers that digital palpation would be very valuable. She maintains that if this had been resorted to in her case a diagnosis would have been made.

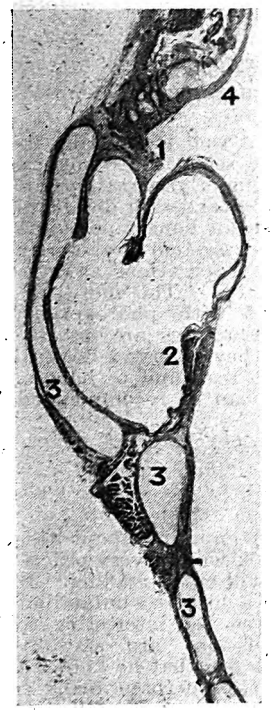

Fig. 2—Cyst bisected in vertical sagittal plane. 1 = false cord, 2 = true cord, 3 = cartilages of larynx; 4 = epiglottis. (×3.)

Jacobi and Rascoff, in an analysis of 13 cases published before their own 2, found that 8 cases died as a result of the cyst. None of these was treated surgically because the condition was unrecognised until revealed at autopsy; 5 cases received surgical treatment and of these 4 recovered, apparently without recurrence. The treatment was the outcome of direct sight of the cyst and consisted in 4 cases simply of its puncture. The fifth case had a tracheotomy performed with removal of the cyst later by resection. In one of these 5 cases the cyst refilled 48 hours later and the child lived for 20 days. The duration of life in the untreated cases ranged from 37 hours to 10 weeks. Snaith has since reported a case dying within a few hours of birth. Death in most cases was due to asphyxia or exhaustion.

Thus if the condition is borne in mind in cases of respiratory distress it is not difficult to diagnose and is amenable to treatment. Simple puncture of the cyst is often completely successful. If the child's condition is very poor tracheotomy may be done and the cyst removed when the general condition has improved. If undiagnosed the condition is uniformly fatal in the newborn, after a longer or shorter interval.

SUMMARY

A case of congenital cyst of the larynx is reported. It is suggested that the cyst arose by atresia of the laryngeal ventricle. The condition is rare but nevertheless should be borne in mind as a preventable cause of neonatal death.

Diagnosis can be made by laryngoscopy or by palpation.

Treatment is by resection or simple puncture of the cyst; preliminary tracheotomy may be needed.

I wish to thank Dr. H. G. McPherson for information about the child before admission to hospital, Prof. Dugald Baird for access to case-records, Dr. J. Craig for the clinical history, and Mr. W. A. Nelson for the photographs.

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OXFORD VAPORISER FOR ENDOTRACHEAL ANÆSTHESIA

M. A. RUSHTON, MB CAMB, LDS
CAPTAIN RAMC; ANÆSTHETIST TO A MAXILLOFACIAL UNIT

I USED the Oxford vaporiser[1] for anæsthesia in the operative treatment of maxillofacial injuries sustained in the Tunisia fighting by the Eighth Army. Owing to the length of the lines of communication and transport difficulties nitrous oxide was not available, and the vaporiser was found a very satisfactory substitute.

This report is based on the first 120 cases in which the vaporiser was used for endotracheal anæsthesia in this maxillofacial unit. I have divided the cases into two groups: in 60 cases 'Pentothal' was not used during induction; and in 60 cases it was used.

Among those in which pentothal was not used the average duration of each case was 70 min, and the average consumption of anæsthetic per case was 0·25 fl. oz. of chloroform, and 5 fl. oz. of ether. There was slight postoperative vomiting (less than 4 times) in 12 cases (20%). There were no cases of severe postoperative vomiting, or of chest complications, and no deaths.

Among those in which pentothal was used the average duration of each case was 70 min. and the average consumption per case was: penthothal 0·25 g., chloroform 0·25 fl. oz. and ether 4 fl. oz. There was slight postoperative vomiting in 3 cases (5%); again there were no severe vomiting, no chest complications, and no deaths.

TECHNIQUE

Whenever possible, patients were starved for at least 6 hours before operation. One hour before, they received a hypodermic injection of morphine with either atropine or hyoscine. Hyoscine is considered preferable to atropine because induction is quieter and there is often an agreeable amnesia.

Several forms of induction were tried.

Induction with ether using the Oxford vaporiser was slow and unpleasant to the patient. Pentothal followed by ether using the Oxford vaporiser was not unpleasant, and was used where chloroform was contra-indicated because adrenaline was being used during the operation; induction was speeded up by introducing a little carbon dioxide (5%) in oxygen into the vaporiser. Chloroform and ether mixture (C_2E_3) was satisfactory but was still sometimes followed by postoperative vomiting, though not so commonly as pentothal and ether. Ethyl chloride permitted very early blind intubation, but was followed by a relatively high incidence of postoperative vomiting.

The method of choice, and that which was eventually used in most cases, was the initial rapid intravenous injection of 0·25 g. of pentothal, followed by chloroform and ether mixture on the open mask. The dose of pentothal used was small in order to prevent undue depression of respiration with

1. Macintosh, R. R. and Mendelssohn, K. *Lancet*, 1941, II, 61.

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consequent delay in induction. This method, besides being reasonably rapid, was pleasant for the patients and permitted them to face the subsequent anæsthetics, so common in maxillofacial work, with equanimity. Moreover the incidence of postoperative vomiting was greatly reduced.

As soon as the patient had been intubated he was connected up with the vaporiser, and anæsthesia was deepened until the jaw was sufficiently relaxed for the throat to be packed. A few minutes with a setting of 15% ether concentration was usually found to be sufficient. Most maxillofacial cases are of relatively long duration but do not require very deep anæsthesia and settings of between 5% and 10% ether concentration could often be maintained for long periods. In any case of long duration a small flow of oxygen was fed to the machine as a routine. Wherever there was any sign of operative shock, one pint of 5% glucose saline with 10 units of insulin was given intravenously.

I attribute the absence of chest complications to two factors:—

(*a*) The incidence of chest complications in maxillofacial work is always low because there is no interference with respiratory function.

(*b*) The ether vapour inhaled was of constant strength, thanks to the use of the Oxford vaporiser, and too strong a vapour was not given at any time.

CONCLUSION

The two great advantages of the Oxford vaporiser over the simple "tin-can" vaporiser are that the strength of ether vapour is a known constant and can be varied as the occasion demands; and the expiratory valve eliminates rebreathing, thus abolishing the dead space, and helping to keep the inspired ether concentration constant. A quiet anæsthesia results.

The advantages usually claimed for gas, oxygen and ether combination over plain ether are a rapid, not unpleasant induction and a low incidence of postoperative complications, as well as a more comfortable recovery period. The pentothal-chloroform-ether sequence provides an ideal induction. With this method of induction, and the use of the Oxford vaporiser the incidence of postoperative complications has been no higher (in this type of work) with ether than with the gas-oxygen-ether combination, though admittedly the recovery period has in some cases been less agreeable. Finally the far greater portability of the Oxford vaporiser, compared with the field Boyle with its heavy cylinders, makes it, in my estimation, the best means of providing anæsthesia for this type of work in the field.

Reviews of Books

Medical Annual, 1943

(61st year). Editors: Sir HENRY TIDY, DM OXFD, FRCP; A. RENDLE SHORT, MD LOND., FRCS. (Wright. Pp. 432. 25*s*.)

THIS hardy annual is an old friend whose individuality places it in a category by itself. The contributors are not only outstanding, but can present intricate subjects in a manner intelligible to the general practitioner. Few advances of note are overlooked, and a sense of proportion makes the book particularly valuable to those who have neither time nor opportunity to study original papers as they appear. Camaraderie between editors and contributors must be of the right stuff, judging by the frank way the editors interpolate their comments: for example, "This has never been observed in females. (This is incorrect. I have seen a case in an adult woman.—Ed.)." Again, many of the articles are refreshingly discriminating. Macdonald Critchley pours a salutary douche of cold water on the uncritical enthusiasm with which electroconvulsive therapy is being used; and Symonds's survey of sciatica is a masterpiece of impartial summing up. In contrast, the article on diabetes mellitus is somewhat confusing. A lapse in balance is the unnecessary amount of space given to yellow fever and to spontaneous hypoglycæmia. Mr. Harcourt Kitchin ably reviews all the noteworthy legal decisions of the year which have interest for the medical profession.

Social Therapy

M. B. HALE, London Charity Organisation Staff 1935–39; S. M. HALE, psychiatric social worker for the organisation 1933–38. (Williams and Norgate. Pp. 96. 5*s*.)

Mr. and Mrs. Hale describe their book as "material for discussion to first-year students at the Schools of Social Science, officials of the Assistance Board and other statutory institutions, helpers in voluntary organisations and others." It forms a good groundwork for this purpose, stimulating to individual opinion. Social workers in this country are badly in need of textbooks other than those of American origin and this little book, by workers of practical experience, is sound in principle, offers a good framework of information, and is readable besides. Defining case-work as "the art of making sympathetic contact with the client, then of interpreting his difficulties to himself in relation to the other members of his family, to his immediate circle, and to society," the writers give a clear conception of their own ideals and follow it up with practical guidance as to how to achieve them. Writing on the keeping of records they mention that it is essential to keep a copy of all letters sent, and add: "unfortunately it is necessary to emphasise the importance of keeping a *legible* copy." Those who have to struggle with their predecessors' handwritten flimsies will heartily endorse this practical advice.

A Practice of Orthopædic Surgery

(2nd ed.) T. P. MCMURRAY, M CH, FRCSE. (E. Arnold. Pp. 423. 30*s*.)

A SECOND edition of this book is well justified by its popularity with the student. It sets out to give a description of the basic principles underlying orthopædic surgery, without overburdening the text with details of operative procedure. The diseases of bones and joints and other lesions of the locomotor system are clearly and succinctly described, and such operations as have proved their worth briefly indicated. The more important conditions are illustrated with photographs, diagrams and X-ray pictures. Fractures are not included, as the author rightly feels they deserve a book to themselves. This book is easy to read and to handle, and is of a comfortable size. It can be recommended with enthusiasm.

Medical Aspects of Aviation

Speed and Acceleration. Captain ERNST JOKL, MD. (Pitman. Pp. 104. 10*s*. 6*d*.)

THERE is a pleasant lack of pomposity about this informal and informative little book which every practitioner, in or out of the Services, will enjoy reading. It explores the body's resistance to a hitherto unfamiliar kind of mechanical strain in a way too interesting to miss. Dr. Jokl's scientific omissions are skilfully managed so as to make the reader feel that he knows a great deal more than he actually—or perhaps really—does, and the numerous illustrations by E. Ullman, art editor of the Johannesburg *Forum*, are drawn with wit and insight.

Anatomy of the Female Pelvis

Including a description of the placenta and its formation and the fœtal circulation. C. F. V. SMOUT, MB BIRM., senior lecturer and acting professor, department of anatomy, University of Birmingham. (Arnold. Pp. 185. 35*s*.)

TEACHERS and students of obstetrics and gynæcology have long waited for a book of this calibre. The anatomy and physiology of the female genital tract is presented lucidly and instructively, with explanations, based on anatomical, physiological and embryological principles, of those clinical phenomena which puzzle students. Ovarian endocrine function, for example, is discussed in such a way that the student can easily grasp the essentials of this intricate and confusing subject. The many microphotographs and coloured illustrations are remarkable findings in a book in the fourth year of war.

ROYAL EYE HOSPITAL CLINICAL SOCIETY.—A meeting will be held at the hospital on Friday, Nov. 5, at 4.30 PM, when Mr. Harvey Jackson will speak on orbital tumours.

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THE LANCET

LONDON: SATURDAY, OCTOBER 23, 1943

THE PATIENT'S WORK

WAR has emphasised the connexion between work and health: not only do the circumstances of work influence personal well-being, but industrial efficiency is increased by the health and happiness of the workers. A health policy should therefore include the closer linkage of industrial health services with the machinery for safeguarding the general health. There has been too much tendency to regard industrial medicine as a thing apart, and the profession as a whole must take more cognisance of the work of patients and its health significance. RAMAZZINI,[1] the father of industrial medicine, wrote that to the Hippocratic formula for the investigation of sickness he "presumed to add one interrogation more—'namely, what Trade he is of'" and he went on to counsel, doubtless without malice, "when a Physician therefore is call'd to visit one of the poorer and meaner sort of People, I would advise him not clap his hand to the Pulse as soon as he comes into the Room, without inquiring into the circumstances of the Patient, nor to stand, as 'twere, in a transient Posture, to Prescribe where the Life of Man is concern'd; but to sit down by the Patient, let the Place be never so sorry, and carefully interrogate him upon such things, as both the Precepts of our Art, and the Offices of Piety require us to know." He was perhaps influenced by the teaching of PLATO [2] who drew a sharp distinction in *The Laws* between the two types of doctors, one practising upon freemen (he "carries his enquiries far back") the other upon slaves—waiting for them in the dispensaries, never talking to them individually or letting them talk about their own individual complaints. "The slave doctor prescribes what mere experience suggests, as if he had exact knowledge; and when he has given his orders, like a despot, he rushes off with equal assurance to some other servant who is ill; and so relieves the master of the house of his invalid slaves."

We have made some progress since PLATO and RAMAZZINI and now recognise that reaction to work is not confined to one stratum of society, and that unemployment may have results just as disastrous as work that is too exacting. Lately there have been complaints that rejects from the Services have been directed into work incompatible with their disabilities, and at the end of the war there will undoubtedly be an urge to get away from everything that savours of regimentation; but it is certain that not enough care has been given in the past to helping people, and especially young people, to take up work suited to their aptitudes and capabilities. This becomes still more obvious in the presence of disability or threatened breakdown in health. In Scotland [3] it was found in the Clyde Basin experiment that some 6% of the young persons referred for examination by their own doctors required change of employment if their health was not to be seriously undermined. An earlier experiment to determine what could be done to minimise the increasing volume of long-continued incapacity for work disclosed that of people who had been incapacitated by sickness for as long as three months about 8% needed change of employment if they were to have real hope of restoration to working capacity. Follow-up of a series of men invalided out of the Services showed that change from prewar employment had been recommended for no less than 36%. Admittedly this last figure is swollen to some extent by the circumstances of war and the resultant disorganisation of industry, but the fact remains that there are many cases in which work review is an essential complement to medical care. This implies, as has been suggested, guidance in the selection of suitable work, supervision of working environment and of hours of work—in fact a more physiological approach to the question of employment than has generally prevailed in the past; for it is perhaps fair comment that, despite the excellent work of the Industrial Health Research Board, the approach to industrial health has been too much that of the pathologist: after all, industrial toxicology is but a part, and in the presence of effective supervision of working conditions, not a large part, of the tale of industrial ill health. Since the outbreak of war considerable progress has been made in the appointment of industrial medical officers, and the usefulness of these doctors would be enhanced if the basis of their appointment was satisfactory; which it is not; for a man employed and paid by an industrial organisation cannot hope to enjoy that freedom of action which is essential if he is to achieve the best results. There ought to be closer relationship between the family doctor and the industrial medical officer. Pari passu with improvement in working environment and conditions of service, there is urgent need for the development of facilities which can best be provided as general health measures. These facilities include vocational guidance, consultant help in the prevention of impending health breakdown, advice on the work problems of men with established disease still capable of employment suited to their residual disability, and a rehabilitation service designed to restore the sick and injured as fully as is possible. The provision of such facilities, and encouragement of the family doctor to use them freely, could not fail to promote alike personal health and industrial efficiency.

The report [3] prepared by the medical staff of the Department of Health for Scotland gives a short account of experiments recently undertaken in this important field of social medicine. The results of these experiments, like the findings of the Industrial Health Research Board, must inevitably shape policy.

THE MENOPAUSE AND AFTER

Mr. ERNEST BEVIN answered those who have protested against the call up of older women by pointing out that he had registered nurses and midwives up to sixty without exciting a single comment. The anxiety which the suggestion has aroused does not come from the women themselves, and is not on behalf of women who have worked all their lives; it is on behalf of those home-keeping women who have become, in the minds of their husbands and children, and possibly in their own minds, a fixture there. Perhaps

1. Ramazzini. A Treatise of the Diseases of Tradesmen. English translation. London, 1705.
2. Plato: Selections from Plato, The Laws. Sir Richard Livingstone. World's Classics Series.
3. Health and Industrial Efficiency. Dept. of Health for Scotland. Edinburgh, HM Stationery Office, 1943. See also p. 519.

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it would be useful to consider the position of these women and to discover if possible whether the call up offers them a worse or a better prospect for health than that they would normally face. First, there is no evidence that women who work outside their homes for a living during the menopausal years have worse health than those who are home-keeping; an investigation made some years ago[1] into the menstrual history of a thousand women, especially in relation to the menopause, showed that health and—as far as could be judged—efficiency were only occasionally impaired. Very few had to reduce their work or give it up, or to take more than their usual annual holiday. By far the greater number of women suffer only from moderate discomfort during the change of life, and those who are actively employed seem to suffer less than those who are able to take things easily and give their symptoms full attention.

Neurotic manifestations often ascribed to the climacteric are found in women with a previous history of emotional and nervous instability—very rarely in those who have always been stable and well adjusted. In the forties women reach the break between youth and middle age, and for many of them this entails a painful mental and emotional readjustment. The home-keeping woman whose children are growing up is particularly hardly placed. Husbands and wives are apt to lose touch a little between the thirties and forties, and adolescent children are naturally averse from spending much time at home with their mother; they have important adjustments of their own to make. The prospect for the menopausal woman in these circumstances is rather bleak, and the temptation to magnify trivial symptoms into weapons to retain love (or the observances of love) is considerable. Moreover, her emotional disturbance has repercussions on her physical state; she is fair prey for a psychosomatic illness. At first sight it might be supposed that a woman in this disgruntled state would hardly be a useful candidate for a job. In practice the reverse is true: the job, by making her once more responsible and valued replaces some of the stimuli now missing from her home life; and since fatigue is more commonly a symptom of boredom and dissatisfaction than of overwork she usually feels less tired than she did before. The working-class woman at this time of life is less exposed to her feelings; she may seek prompt treatment for any physical disabilities which crop up, but otherwise she carries on as usual. Some working women, not only at this time but at other periods of life as well, really are suffering from the effects of overwork; but this is because they actually have too much to do—a separate issue from their capacity to do it.

The menopausal years vary considerably in different women; for many the menopause begins at 40, for some it is delayed until after 50. Miss RATHBONE'S remark that the period of 50–65 is often the healthiest in a woman's life is fully endorsed by experience. At this time women have good physique, and the emotions and anxieties of rearing their children and maintaining family life are behind them. If they have had any form of training in earlier life it adds to their capacity at this age, and they usually take kindly to a job provided there is some elasticity in the pace and hours of work. They have shown themselves to be adaptable, and readily develop skilled movements and understanding of their task once their confidence is established.

1. *Lancet*, 1933, i, 106.

SPONTANEOUS SUBARACHNOID HÆMORRHAGE

IT was the work of TURNBULL[1] and FEARNSIDES[2] that first aroused interest in intracranial aneurysms as a cause of spontaneous subarachnoid hæmorrhage. On our opening page Dr. MAGEE brings the story up to date and adds his own extensive observations which have the special interest that his material was drawn mainly from the Forces and Civil Defence Services. His patients, for the most part between 20 and 50 and presumably mostly male, belong to a group in which subarachnoid hæmorrhage is not very common, and although the disorder is in general commoner among women than men the incidence in women in this particular group seems to have been low.

The fatality of subarachnoid hæmorrhage is high, 56% in MAGEE'S series of 150, and 63% in TAYLOR and WHITFIELD'S[3] series of 81 cases. About a third of MAGEE'S patients died in the first attack, and more than half the survivors had a second attack which proved fatal in two-thirds of the cases. A second hæmorrhage is thus twice as likely to be fatal as a first. These figures lend strong support to JEFFERSON'S[4] recommendation of treatment by carotid ligature when the aneurysm has been localised by angiography. This, of course, applies especially to those aneurysms which give rise to focal signs enabling diagnosis before rupture. MAGEE'S observation that in most cases effort plays no part in precipitating a hæmorrhage is clearly of importance in relation to claims for compensation and for service pensions. The qualification "in most cases" is necessary, for it is within the experience of clinicians that occasionally the hæmorrhage occurs during violent physical exertion, as for example in a man who fell unconscious while pulling in a tug of war; it would certainly be difficult to persuade a court that a man whose hæmorrhage took place while he was lifting a heavy sack had not sustained an accident "arising out of or in the course of his employment."

BALLANTYNE[5] has recently studied the way in which subarachnoid hæmorrhage causes ocular symptoms. The earliest explanation of intra-ocular hæmorrhage after subarachnoid hæmorrhage was that blood was forced from the optic nerve sheath through the lamina cribosa into the eye. This hypothesis was disproved and replaced by the suggestion that blood driven into the subarachnoid space of the optic nerve sheath compressed the ophthalmic vein and caused hæmorrhages from its tributaries. BALLANTYNE shows that hæmorrhages occur in the orbit which cannot be caused in this way and produces evidence that such multiple hæmorrhages can be explained only by the sudden rise of intracranial pressure causing a stasis in all the venous channels which drain the tissues of the eye and the contents of the orbit. He makes the suggestion that the same mechanism may cause hæmorrhages into the substance of the brain

1. Turnbull, H. M. *Quart. J. Med.* 1915, 8, 201.
2. Fearnsides, E. G. *Brain*, 1916, 39, 224.
3. Taylor, B. and Whitfield, A. G. W. *Quart. J. Med.* 1936, 5, 46
4. Jefferson, G. *Brain*, 1937, 60, 444.
5. Ballantyne, A. J. *Brit. J. Ophthal.* 1943, 27, 383.

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and that some of the clinical signs of subarachnoid hæmorrhage, such as oculomotor paresis and disturbances of conjugate movements of the eyes, may be due to hæmorrhages in the mid-brain.

HARD HEADS AND HARD LABOUR

SOME expectant mothers are refusing to take their cod-liver oil and even their extra milk for fear of having large babies and long labours. This idea no doubt arose from an isolated case or two of long labour in women who had conscientiously taken advantage of the Government's wise provision for their wellbeing, and it will be a great pity if it is allowed to spread. For there is no doubt that a generous supply of calcium and vitamin D is essential for the proper calcification of fœtal bones and teeth; long ago MELLANBY [1] pointed out that a deficiency of vitamin D in the maternal diet results in a lowered vitality of the offspring after birth and a predisposition to rickets. A small investigation in America can be cited as grounds for the fear that dietetic supplements may prolong labour. FINOLA, TRUMP and GRIMSON [2] gave 33 expectant mothers 250 units of vitamin D and dicalcium phosphate equivalent to 1·44 g. of calcium and 1·08 g. of phosphorus daily; 25 other women acted as controls, receiving no supplement. The average birth-weight of the infants was I oz. less in the treated than in the control group, but labour in the treated lasted on an average an hour longer than in the controls. The total serum calcium and inorganic phosphorus of the newborn was higher in the treated group, and radiograms of the ribs, parietal bones and epiphyses at the knee showed an increased bone density in most of these infants compared with the controls. FINOLA and his colleagues suggest that the extra density of the parietal bones might interfere with moulding of the head in borderline cases of disproportion. But a nation-wide radiological investigation would be needed before the effect of vitamin D on the fœtal skeleton could be properly evaluated, and that is out of the question at present.

An inquiry which must carry weight is that of the People's League of Health,[3] which was directed from the outset by statisticians of high repute. In this research 5000 expectant mothers living in London were divided into two equal groups. The treated were given, among other supplements, min. 6 of halibut oil daily, containing about 19,000 IU of vitamin A and 900 IU of vitamin D, from before the 24th week of pregnancy until delivery. Regarding birth-weight, there was a difference of 0·18 lb., which approached significance, in favour of the treated primigravidæ aged 30 and over; there was no significant difference in the other age-groups. With multiparæ of all ages the difference between the birth-weights was 0·07 ± 0·05 lb. in favour of the treated, which was not significant, but in 3 out of 4 age-groups the babies of the treated mothers were slightly heavier. But—and this is the main point from the expectant mothers' point of view—there was no evidence that vitamin and mineral additions to the dietary influenced either the severity or duration of labour.

1. Mellanby, E. *Brit. med. J.* 1926, i, 515.
2. Finola, G. C., Trump, R. A. and Grimson, M. *Amer. J. Obstet. Gynec.* 1937, **34**, 955.
3. *Lancet*, 1942, ii, 10.

Annotations

WHICH ARE THE "TEACHING SCHOOLS"?

THE five or six years which precede the taking of a degree or diploma are largely spent in factual instruction. The subjects of the curriculum can be, and sometimes are, the medium of "education"; but even when it is there, the intention is often frustrated by the limitation of time imposed upon each subject separately, and the many claims upon receptivity and memory pile confusion upon competition. In the invaluable year after qualification comes the opportunity for the education that turns a boy into a man. It is then that the senior who recognises his duties as well as his rights can "teach" in freedom. If the senior is a professor with a team of experts in education, perhaps his house-physicians and house-surgeons go to the best school; but the great majority of young men and women go to other masters, and hospitals other than those with medical schools.

It is remarkable that neither the universities nor the Royal Colleges have openly and specifically recognised the educational responsibilities accepted and discharged by the staffs of voluntary and local-authority hospitals throughout the country. In the same way, for the best part of a century the value of the services of all those engaged in preclinical instruction were also greatly underestimated or altogether unrealised. But latterly there have been great changes, and if, in the near future, the subsidy to medical education is to be substantially increased, the question may well be asked "who are the teachers and which are the teaching hospitals"? Is it not open to the staffs of the non-teaching voluntary hospitals and of the great municipal and county general hospitals to say to the universities, "We are doing a considerable part of your work; with us men train for their higher degrees; we are, in fact, a part of your staff." To such a claim a university might reply, "Who are you? Who appointed you? Upon what qualifications? Upon what academic attainments? What are the resources you draw upon in performing these educational duties?" Is it to be presumed that the hospitals would shrink from such inquiries? and if they did, to what category of inferiority would they consign themselves? The better the hospital, using the word in its most comprehensive sense, the more determinedly would it strive to earn the approval of the university; to secure the hallmark which advertises to every patient entering its walls that "here you will be cared for by men who know their job and have at their disposal all that is needed for their best work."

It would be something gained if the teaching activities of hospital clinicians all over the country were recognised, and perhaps remunerated: that would be good for the doctors. It would be immeasurably more important for the patients—and that is for the whole community—that the standard of work, its organisation and its equipment, would come under the watchful eye of an impartial judge of standards.

THE PSYCHIATRIST AND THE CRIMINAL

Dr. W. Norwood East, in his presidential address to the section of psychiatry of the Royal Society of Medicine on Oct. 12, nicely illustrated the maxim:

> Be not the first by whom the new are tried
> Nor yet the last to lay the old aside.

Criminal responsibility, he feels, is a legal concept which the public understands and approves; and as yet psychiatry has no satisfactory substitute to offer for it. Yet crime, as he pointed out, is created by the law's definitions; and what may be a crime in one society may be acceptable behaviour in another. Thus Eskimos regard suicide and the killing of unwanted infants, old people and invalids, as a part of social life. In our own

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society civil and criminal offences differ not in kind but in the legal procedures which follow them. Criminal offences may derive from worthy impulses—from loyalty to an individual or a group—and repeated offences may be evidence of mental disorder or of an arrest in emotional development, fixing the criminal at a gain-loss level of behaviour. Legal interest in crime turns on the guilt of the accused—medical interest on his personality. Acquisitive, aggressive and sexual crimes depend on instincts and are associated with an emotional quality; yet it may be not immediately apparent from the crime itself what instinct is at work. Thus, while most offences appear to be acquisitive, many of them spring from the parental or the self-preservative instincts; and some cases of burglary are primarily sexual. It has been suggested that the decision should be taken out of the jury's hands and settled between the judge and a medical referee, but this Dr. East believes to be a pernicious suggestion. It is impossible to form a fair estimate of a man's case by examining him in court. The prisoner needs to know he has the sympathetic interest of the psychiatrist before rapport can be established. He thought it might be better to let the jury decide whether the man was guilty of the crime or not, leaving it to a medical and legal tribunal to decide on his responsibility before sentence was passed. It would be an intolerable burden on psychiatry in its adolescence, he considered, to have to pass the final judgment on responsibility in a criminal case. As things stand he feels the courts would be best served if they refused to accept evidence on the psychiatric aspects of a case from non-medical psychologists, and if medical men of no psychiatric experience refused to be drawn into giving opinions on those aspects in the witness-box. As the study of culpability progresses it may become possible for psychiatrists to help lawyers in the task of recasting the McNaghten rules to meet changing opinion; but extravagant statements in the witness-box can only delay this. At present justice can only be done to the abnormal offender if the psychiatrist is consulted: but he thinks the treatment of crime might be jeopardised if the public supposed the medical profession wished to disrupt all ordinary criminal measures. He mentioned the advances foreshadowed in the bill on criminal justice being considered before the war. There it was proposed that prison for young offenders should be replaced by remand centres and state remand homes. In the course of an investigation at Wormwood Scrubs he had recommended that a special institution should be established for the investigation and treatment of psychiatric disorders in convicted criminals, with the aim of amending their behaviour. Thus despite his disclaimers, it seems that Dr. East is not averse from whittling the penal code into more modern shape even at this stage of psychological progress.

KALA-AZAR IN THE EAST AFRICAN FORCES

KALA-AZAR has long been known to be endemic in the Sudan, and before the war cases were occasionally seen in the Northern Frontier Province of Kenya. For the 8 years before 1939 no instance of the disease was reported in Uganda or Tanganyika; Italian doctors had, however, recorded its presence in Abyssinia. Anderson [1] reports that in February, 1941, an askari in the East African Forces was found to be suffering from the disease and since that date 136 Africans have been admitted to military hospitals in Kenya; 43 (32%) of these died. Accurate details of the movements of most of the units to which the patients belonged were obtained, and it was found that 87 soldiers contracted the disease near the mouth of the Omo River at the south-western corner of Abyssinia near Lake Rudolf; 12 came from the Uaso-Nyiro district, and 11 were located on the Nairobi-Addis-Ababa road; 8 came from Southern Abyssinia. The relatively large infection of the Army personnel indicated that kala-azar is far more common in Southern Abyssinia and North Kenya than had been suspected; a survey of the civil population would probably support this. G. Maclean found Leishman-Donovan bodies from spleen punctures of civilian natives. V. D. van Someren identified the sandfly, *Phlebotomus congolensis*, in the area and it is believed that other species may be vectors. Most of the infections took place during the wet season, and the probable mean incubation period was 13 weeks. The early cases could only be treated by tartar-emetic injections and in them the mortality was 50%. Far better results were obtained by the administration of diamidinostilbene—a compound related to urea—and 'Urea Stibamine' (Pharm. Products), an antimony preparation.

1. Anderson, T. Farnworth, *E. Afr. med. J.* 1943, **20**, 172.

YOUNG LIFE STILL WASTED

THE enormous reduction in the rate of infant mortality in the last half century—from some 150 deaths per 1000 live births in 1900 to 100 in the years preceding the last war and to just under 60 in the years before this one may, if we be not careful, too easily lull us into complacency. Certainly the Registrar-General's detailed analyses of how this loss of infant life is made up will, if one troubles to study statistical data at all, readily supply many correctives. A glance at his last prewar annual report (1938) shows, for instance, disturbing differences between the large towns. In that year more than 76 infants in each 1000 born died during their first year of life in the county boroughs of Birkenhead, Bootle, Wigan and Merthyr Tydfil; 35 per 1000 or less died in the county boroughs of Bath, Norwich, Oxford and Southend-on-Sea. If we exclude neonatal mortality the differences become still wider, for the former towns are left with rates of over 40 per 1000 at ages 1–12 months while the latter have rates of only 15 or a little less. Alternatively we may turn to the Registrar-General's monumental analysis of occupational mortality in the years 1930–32, which includes a study of infant mortality in relation to the occupation and social class of the father. In those years the death-rate per 1000 legitimate live births was for all classes 62, but it varied from 33 in social class I to 77 in social class V, rising steadily as one passes down the social gradations. Again exclusion of the neonatal mortality widens this difference, giving a rate of 11 per 1000 at 1–12 months for class I and 45 per 1000 for class V. A glance at the occupational figures shows such figures as 31 deaths in the first year of life per 1000 legitimate live births when the father was a doctor and 81 deaths when the father was a general labourer. Or turning to some of the causes of death we note that in social class I there were 1·4 deaths per 1000 live births from infectious diseases and 2·0 from diarrhœa and enteritis; in social class V the corresponding figures are 7·6 and 7·9 or 4 to 5 times as high. However we look at it we clearly cannot rest satisfied with the very great and undoubted improvement that has been achieved, and while such social and environmental differences persist there can be no reason for complacency.

A nasty jar to any such feelings has been given by Mr. Titmuss in his new book.[1] From a careful analysis of the Registrar-General's statistics from 1911 to 1932 he is led to the conclusion that though all social classes have shared in the decline in infant mortality they have not shared equally. The already relatively low rate of social class I has shown a somewhat steeper rate of fall than the relatively high rate of social class V. In other words, in spite of imperfections in the data, it is most probable that the infant death-rates of the most and least favourably circumstanced classes were rather *more* widely separated in 1930–32 than 20 years earlier. At the very best, therefore, our efforts to reduce infant

1. Birth, Poverty and Wealth. Richard M. Titmuss. Hamilton Medical Books. Pp. 118. 7s. 6d.

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mortality, successful as they have been, have notably failed to reduce inequalities in the rate as one goes up or down the social scale and probably have expanded them. These and many other statistical observations Titmuss skilfully marshals as a stimulus to action. If, for example, he calculates, all social classes in 1930–32 had experienced the death-rates of social class I some 52,000 deaths in the first year of life would have been saved and 17,000 in the second year of life. Adding stillbirths would probably raise the total to nearly 90,000, no mean number in the present situation of the population.

The actual extent to which it is possible to reap further improvement is difficult to determine. The social factors of poverty, overcrowding, malnutrition and generally unsatisfactory environment are of course remediable to a much greater extent than has so far been achieved. Ignorance, apathy, lack of care, neglect of the rules of hygiene can certainly be reduced but never banished. Medical skill and attention can be extended and improved. Some few parts of the world have already reached a rate of 20 or less per 1000 live births. Dublin in 1928 suggested that a rate of 30 was feasible. Titmuss goes so far as to halve this figure and suggests that there are no medical, social or economic reasons why advanced communities should not reach a rate of 15. Whether that be utopian or not is hardly a matter of immediate concern. His study of the social and geographical variations shows how much there is yet to do at a very much higher level. It is a welcome corrective to any who with an eye fixed solely on the improving national rate think that all goes well.

VITAMIN A AND NIGHT VISION

NIGHT-BLINDNESS was attributed to scurvy by Captain Cook, even though it failed to clear up like other scorbutic symptoms when the patient got fresh lemons. Bampfield [1] noted in 1814 that fresh meat and vegetables added to the diet improved night vision, whereas antiscorbutics did not; yet he too regarded it as a manifestation of scurvy. The full picture of vitamin-A deficiency as it affects the eyes was described by Holmes Spicer [2] in 1893; he mentioned the greasy wrinkled conjunctiva with foam-like patches on it, and the dry lustreless cornea going on to keratomalacia. During the war of 1914–18 Birch-Hirschfeld [3] specifically mentioned a vitamin deficiency as the probable cause of the great increase in night-blindness in the German army during the winter of 1916. Bloch [4] attributed the outbreak of xerophthalmia in Denmark in 1917 to a deficiency of a fat-soluble vitamin, and the epidemic subsided immediately rationed butter at a controlled price became available to the population. Finally Wald [5] demonstrated the part played by vitamin A in the light-dark cycle of visual purple, and the real importance of this vitamin in the process of night vision was fully established. Since 1939, when complaints of poor vision in the blackout increased, there have been many investigations to ascertain whether the people of this country suffer from vitamin-A deficiency —whether, in fact, there is a general subclinical vitamin lack which, while causing no grave symptoms, is impairing general efficiency and night vision. At present we have no evidence that this is so, or that increased doses of vitamin A would cause any material improvement in the night vision of the population. It is the experience of Service ophthalmologists that many of those complaining of poor night vision do so for psychological reasons. Stephen,[6] of the Oxford Nutrition Survey has recently investigated the effects on 10 male volunteers—9 undergraduates and 1 university demonstrator—of a diet severely deficient in vitamin A. He found that after a month the dark adaptation of 8 of them became poor. After a single dose of halibut-liver oil, however, the light threshold fell sharply; and after a few further doses the original level was reached.

1. Bampfield, R. W. *Med.-chir. Trans.* 1814, **5**, 32.
2. Spicer, H. W. T. *Trans. Ophthal. Soc. U.K.* 1893, **13**, 45.
3. Birch-Hirschfeld, A. v. *Graefes Arch. Ophthal.* 1917, **92**, 273.
4. Bloch, C. E. *J. Hyg., Camb.* 1921, **19**, 283.
5. Wald, G. *J. Ophthal. Soc. Amer.* 1941, **31**, 235.
6. Stephen, D. M. *Trans. ophthal. Soc. U.K.* 1942, **62**, 259.

THE MINISTRY'S BULLETIN

THREE years ago the director-general of Army Medical Services began to issue an informal monthly bulletin available to all his officers and to others concerned. The *Army Medical Department Bulletin* has proved a convenient means of keeping the periphery in touch with the centre, and the Admiralty, which already provided every wardroom with a first-class review of current affairs, has now followed the example of the War Office in producing a special broadsheet for medical officers. In civilian medical services there is less likelihood of professional isolation than in the Army or Navy, but it is none the less advisable that the men at the centre should be able to communicate ideas which have not yet hardened into official memoranda; and in all branches of work it is well to have a medium for circulating suggestions, reports, and other expressions of experience. In war-time the suspension of the two annual reports from the Ministry of Health on the State of the Public Health and the Health of the School Child has deprived medical officers of health and school medical officers of much useful information about departmental policy, and we are all the more glad therefore that the Ministry has now decided to issue a monthly bulletin. This will be combined with the existing monthly bulletin of the Emergency Public Health Laboratory Service—a service directed by the Medical Research Council on behalf of the Ministry of Health—and the combined bulletin will comprise a general section edited from the Ministry and a laboratory section edited from the Council. In the first joint issue, dated October, the former section consists of short signed articles on the antigens of enteric organisms (Dr. V. D. Allison), war-time statistics (Dr. Percy Stocks) safe milk (Dr. W. A. Lethem) the supply of tetanus antitoxin (Mr. C. H. S. Frankau) and child guidance clinics (Dr. A. F. Alford).

Dr. J. W. BROWN will deliver the Bradshaw lecture to the Royal College of Physicians of London on Thursday, Nov. 4, at 2.15 PM. His subject is to be the interauricular septal defect.

Mr. H. S. SOUTTAR is to give a Bradshaw lecture to the Royal College of Surgeons of England on Thursday, Nov. 11, at 3.15 PM. He will speak on physics and the surgeon.

Lieut.-General Sir ALEXANDER HOOD, director-general of Army Medical Services, is visiting the United States.

LECTURES IN SURGERY AT EDINBURGH.—During the autumn the following lectures will be given at 2 PM on Tuesdays at University New Buildings, Edinburgh: Surgeon Rear-Admiral G. Gordon-Taylor, the dramatic in surgery (Oct. 26); Prof. W. C. Wilson, the general state of men severely wounded in battle (Nov. 2); Colonel J. A. Macfarlane, carcinoma of the rectum and sigmoid (Nov. 9); Mr. James Riley, experimental cancer research (Nov. 16); Brigadier George Riddoch, sciatica (Nov. 23); Prof. C. F. W. Illingworth, peptic ulcer (Nov. 30); Colonel Johan Holst, surgical treatment of pulmonary tuberculosis (Dec. 7). The lectures are open to fifth year students and to medical members of the Services and the Emergency Medical Service.

ROYAL SANITARY INSTITUTE.—A meeting will be held at the Pump Room, Bath, at 10.15 AM on Saturday, Nov. 6, when Mr. A. Tyler, chief sanitary inspector for the city, will read a paper on food standards, and Mr. J. Owens, city engineer, a paper on some aspects of the postwar housing problem. Further information may be had from the local secretary Dr. James Blackett, Health Office, Sawclose, Bath.

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Special Articles

SOCIAL INSURANCE AND MEDICAL SERVICES ABROAD

PROFESSOR HERMANN LEVY

IN its comprehensive report on social insurance, published in 1936, the International Labour Office observed that when sickness insurance funds were first set up, their main purpose was to provide cash benefits for sick persons, and that they paid comparatively little attention to medical treatment. The report was glad to emphasise that this attitude had changed: "The principal object is now to restore health and working capacity, and first place is therefore given to medical, surgical and pharmaceutical benefits."

Unfortunately this statement does not hold good of social insurance in Britain. In this country neither National Health Insurance nor Workmen's Compensation has been based on, or developed into, really restorative medical services. The agencies entrusted with administration of this section of social insurance, such as approved societies, insurance committees, mutual indemnity associations and insurance companies, have shown little or no interest in developing medical service systematically or dynamically. This is not altogether their fault. Far more is it the fault of legislation which did not include full restoration to health among statutory obligations under the insurance schemes, and which—through such unhappy arrangements as those of lump-sum settlements or the "light work" provisions of workmen's compensation—even drew away from the aim of restoration to health.

BRITISH NEGLECT OF FOREIGN EXPERIENCE

It cannot be said that such aims were not before the eyes of the early British insurance legislators. One may recall that in 1913 an official Report on Medical Benefit under the German Sickness Insurance Legislation (Cmd. 6581) explained that the German local sickness funds were giving "a very liberal interpretation to medical treatment," and that the insured were able to get elaborate specialist treatment without much formality. Yet the most recent valuation of National Health Insurance shows that about five-sixths of the additional treatment benefits, which would be expected to cover the more refined medical services of all kinds, went into dental and ophthalmic benefits, which in most other countries are included into the ordinary statutory benefits as a matter of course.

There can be no doubt that the alienation of the British social insurance services from medical treatment problems has brought the whole system of social insurance into disrepute. Whereas abroad social insurance has fully justified the expectations of the medical profession and social reformers, in Britain Sir William Beveridge could apparently draw no other conclusion from the medical deficiencies under which the health insurance services labour than to propose to divorce the medical service of the nation once and for all from the insurance machinery—which according to his plan would only remain as a contributory automaton and lose all its possible constructive and productive functions. It would, if the plan were accepted, contrast with almost all other schemes in the world. Yet, since the Beveridge plan was published the difficulties of creating a comprehensive national health scheme having no connexion with insurance administration, have become only too manifest. Would it not therefore be appropriate to abandon an "isolationist" attitude and devote some study to the methods by which for decades foreign self-supporting insurance institutions have successfully developed medical services, including specialist treatment, rehabilitation, the supply of appliances and medical and surgical aids, hospital care, treatment in sanatoriums, nursing and maternity services?

Perhaps the neglect of foreign experience is partly explained by the fact that reform on the international pattern would lead neither to the creation of a national medical service, centralised and divorced from social insurance, nor to the retention of the present system of approved societies and insurance committees under NHI. If one asks what fundamentally has enabled foreign systems of sickness insurance, introduced in countries less wealthy than Britain, to achieve such high medical results, the answer lies not in any greater efficiency of the medical profession abroad, but simply in the fact that the organisation of social insurance has been, and still is, basically different.

SICKNESS FUNDS ABROAD

In almost all countries it has become customary to entrust sickness funds with the task of medical service under insurance schemes. Such funds are mostly local sickness funds; more rarely they are occupational funds of groups of workers or of big undertakings. But they are not competitive and not organised in an entirely fortuitous and disintegrated way, as approved societies are. They are funds which have to deal year by year on a territorial basis with an almost steady risk or sickness expectation; they are in a position to review in detail the special medical needs of any district, urban or rural; and by a flexible rate of contributions—in contrast to the crude British flat-rate system—they are enabled to adapt their income to their specific medical needs.

These bodies are not purely "communal"; their administration is entrusted to representatives of employers and employees, subject of course to the necessary supervision and control by public authority. It is this administrative basis that provides these social insurance agencies with the impetus and the financial means to carry through, with the help of the medical profession, any desirable medical schemes. Their counterparts in the field of industrial accident insurance are mutual indemnity associations, or workmen's compensation boards, composed of employers and representatives of workers, responsible for administration of the statutory provisions of industrial accident insurance as they also relate to medical treatment and full restoration of the severely injured. These latter bodies are generally grouped according to classified industries, for thereby they are best able to comply with the particular requirements of the various types of industrial diseases.

It is on this financial and administrative basis that sickness funds and workmen's compensation abroad have achieved their most striking results. It should be noted that such results have not been reached by centralised planning but by the decentralised effort of local and other insurance groups which were impelled by their own enthusiasm as much as by legislation. The speed of providing what is called "medical equipment of insurance institutions" has been remarkable—more remarkable perhaps than it would have ever been under state schemes. In Poland, for instance, where the relevant provisions did not come into force until 1920, the funds, or their federations, had by the end of 1924 as many as 312 clinics, 116 pharmacies, 55 hospitals, 1 maternity home, 7 sanatoriums, 18 rest homes, 39 X-ray institutes, 66 ultraviolet apparatus, 23 analytical laboratories, 1 biological laboratory, 5 pharmaceutical laboratories. Lately the social insurance funds in Peru, Ecuador, and Bolivia—also newcomers in the field—have begun to create a network of hospitals and clinics of their own in order to make up for deficiencies in the national health equipment. In Czechoslovakia each sickness fund must belong to a federation of funds whose duties include the establishment and management of hospitals and pharmacies.

Writing just before the advent of National Socialism under which the social insurance services rapidly deteriorated, Dr. G. F. McCleary gave the following account of the achievements of some of the German local sickness funds; the General Local Sickness Fund of Hamburg had then 4 institutes for artificial sunlight therapy where about 7000 persons were treated annually, and a large orthopædic institute with its own workshop for making appliances. Diagnostic facilities were provided on a large scale. The institute of the Association of the Local Sickness Funds of Berlin contained chemical, pathological, bacteriological and serological departments, and made 5000–6000 examinations monthly. The miners' sickness funds (occupational funds) had founded many model hospitals, for the special needs of the population in mining districts.

SPECIALIST FACILITIES UNDER SICKNESS INSURANCE

The International Labour Office states that in some countries "clinics have become the centre of the medical

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work of the funds, from the point of view both of diagnosis and of therapeutics. They make it possible to concentrate the medical service, placing at its disposal all the necessary appliances." Among others, dental institutes have been set up by the sickness funds in many industrial towns in Central European countries, and these institutes have drawn the attention of the working population to the importance of dental treatment. It should, however, be noted that this kind of organisation does not imply that the insurance funds must exclusively rely upon their own institutions. Specialist treatment may be given by arrangement between the insurance societies and outside institutions of all kinds. The experience has been that if properly equipped, the clinics of insurance funds, have, in the words of the International Labour Office "many advantages that the consulting-rooms of doctors, who work without the assistance of a staff, do not possess"—an observation that should be particularly noted in connexion with the present discussion about health centres. Although leaving perfect freedom to panel practitioners, the institutions of the sickness funds have been able to act as such centres if so required. Their vast range of diagnostic and research facilities has appealed to doctors and in this way, as McCleary said, have become one of the most important links between the funds and practitioners, who, apart from their daily routine work, aim at following up their particular studies and medical interests.

This is no small achievement of the organisation of social insurance abroad. The result has been that the medical profession in those countries feels just as much in need of the insurance institutions as these are in need of professional services.

HOW IS THE DOCTOR EMPLOYED?

First-rate medical equipment is, however, only one of the necessities that sickness funds have to provide in order to fulfil their obligation of medical treatment. Not less important is the supply of the personal medical service. "Medical benefit has remained a general practitioner service in Great Britain, *but nowhere else*," said the International Labour Office in 1942. It is perhaps for that reason that the administration of NHI in Britain has done little to make insurance practice particularly attractive. Where, as in other countries, such practice includes the services not only of the rank and file, but also of the highest medical authorities, insurance institutions have to make the service as attractive financially as the economical administration of benefits allows.

In Western Europe the medical service of compulsory sickness insurance is organised very largely on the lines of private individual practice. Negotiation between medical associations and the federation of sickness funds usually decides the scale of remuneration and other terms of service for doctors engaging in it. All qualified doctors may participate, but it should be noted that sometimes the medical association imposes restrictions to prevent overcrowding of the service. The prevailing method of remuneration is by a fee varying with the nature of the treatment given to the patient; the annual capitation fee adopted in Great Britain for its practitioner service remains an exception, and can be explained only by the fact that the restriction of medical treatment to the general practitioner under NHI makes possible this crudest form of remuneration. In some countries sickness funds in the towns have salaried specialists to attend daily at the funds' clinics.

In Chile and Peru all insurance doctors are employed—though not always full-time—on a salaried basis; and all ambulatory treatment is furnished at health centres by a group of practitioners and specialists. This arrangement, however, may not be so much due to particular advantages of the system as to the fact that sickness insurance in sparsely populated territories requires an organisation very different from that of densely populated districts. In Russia under the national medical service all medical workers of every type and of every grade are employed and paid by the state or semi-official bodies. On the other hand, as the example of New Zealand shows, nationalisation of medical service does not necessarily prevent the doctor from remaining a private person. In this the "social insurance" approach differs decidedly from the "social assistance" approach, the latter necessarily makes use of salaried doctors or salaried medical officers who may (as in Ireland) render every necessary kind of medical service, or who may (as in the rural areas of Norway and Sweden) perform public health duties besides treating the sick.

It has sometimes been argued that the existence of state or communal doctors need not interfere with the free choice of doctor by the patient, for he might be allowed to choose among many such doctors. This argument is purely theoretical. In practice—the official employment of full-time salaried doctors would hardly be compatible with free choice. For if the official administration found that under free choice some of its doctors were less popular than others, it would encounter considerable difficulty in dismissing them.

A system of official doctors can hardly be run economically unless the insured population is under obligation to seek medical treatment from the doctor provided for them in their district or otherwise. To this arrangement insurance doctors of almost all countries have objected: in the words of the International Labour Office, "Medicine is a liberal profession, and, while an increasing proportion of doctors have been accepting salaried positions in public health administration, the majority, following the leaders of their associations, have vigorously withstood the attempt of sickness insurance to regiment them in a salaried service." While under the present system of social insurance abroad the panel doctor or specialist may well retain his private practice among the well-to-do, the interests of his insured patient do not suffer; for every doctor, even the highly paid specialist, regards himself as a "partner" in the insurance fund and that its welfare is closely related to his own. This does not exclude possible restrictions in the extent of private practice, arising from the obligations of the insurance doctor towards the sickness fund. Nor does it exclude the further development of group practice, under sickness insurance schemes, without restricting the liberties of the individual practitioner.

REMUNERATION

Not less important than the method of employment is the method of payment. As has already been stated, the crude form of a uniform capitation fee is peculiar to Britain. The rule elsewhere now is that insurance general practitioners are paid according to services rendered—i.e., per consultation or per visit—or according to the number of cases treated. In addition, special fees may be paid for extra services such as the reduction of dislocations, the setting of fractures or treatment by injections. Specialists are everywhere paid higher rates than general practitioners.

Naturally there are many variations in detail. In France, for instance, the Minister of Labour and the Superior Social Insurance Council jointly prepare a tariff of fees payable to practitioners or specialists, for advice in their consulting-rooms, different rates being fixed for large towns, medium-sized towns and other areas. Germany in 1932 adopted a system of payment which may be called a refined and adjusted capitation fee. The individual practitioner's share of remuneration is calculated according to a graduated scale, in which the rate per case treated falls when the number of cases treated rises. In Hungary there is a fixed basic salary and special allowances for extra services, night visits, consultations, and of course mileage. The annual fixed salary is based on the daily number of hours at the dispensary. Similar methods have been adopted in Poland. In Germany the system of remuneration also takes account of the personal situation of panel doctors; thus, if they have large families or are unable to make a living out of insurance practice because they work in distressed areas they may get special allowances.

These examples, different as the various methods of remuneration may appear, illustrate the tendency to adjust the remuneration of practitioners to different economic conditions thus avoiding the possible inequities inherent to the rigidity of the British flat-rate capitation fee. Any progress in British social insurance, and particularly the inclusion of dependants and special treatment in National Health Insurance, will necessitate the adoption of more liberal and flexible methods for the payment of insurance doctors. Much can be learnt about such methods from experience abroad, where social

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insurance, on the whole, has constantly invigorated the medical services.

Far from being divorced from medical organisation, social insurance in other countries has become an integral part of it.

SCOTTISH HOSPITALS

THE HETHERINGTON REPORT

THE main principles of hospital policy after the war were outlined by the Minister of Health in October, 1941. They were to provide a comprehensive service for all who need it; to do this through the larger health authorities, who will thus have the duty of putting the partnership between voluntary and municipal hospitals on a regular footing; to base the service on areas larger than those of individual authorities; to ensure that the patient pays a reasonable contribution towards the cost of treatment, whether through contributory schemes or otherwise; to assist local authorities with any new burdens by means of Exchequer grants; and to provide special educational grants for teaching hospitals.

The committee on Scottish postwar hospital problems, set up by the Secretary of State for Scotland in January, 1942, was not called upon to design a hospital policy, but to solve as far as possible the administrative problems which the Government will face when it comes to implement the comprehensive regional policy already foreshadowed. Within this policy the Scottish Committee were required to make recommendations on:

(1) the future administration of new hospitals built and at present administered by the Government as part of the EMS;

(2) the arrangements most likely to secure the maximum coöperation between voluntary, local authority and EMS hospitals; and

(3) the financial arrangements between voluntary and local authority hospitals and patients and contributors best fitted to enable those hospitals to coöperate in the coördinated hospital service.

The committee, under Sir Hector Hetherington as chairman, have met 31 times and now publish their report.[1]

In a lucid introduction they note that their main task has been to work out a method of partnership between the voluntary and statutory authorities; and they have proceeded on the assumptions that the dual system of voluntary and municipal hospitals will continue after the war, and that a statutory duty will be placed on county councils and town councils of large burghs—singly or combined—to initiate and maintain arrangements for a comprehensive hospital service on a regional basis.

THE FUTURE OF EMS HOSPITALS

Their conclusions about the EMS come last in their report, but since they are brief and straightforward may conveniently be mentioned here. The committee suggest that once the war is over the seven new hospitals, offering 7000 beds for war-time purposes, and probably about 5000 in peace-time, should no longer be administered by the Department of Health. In proposing this, they are making no adverse reflections on the Department; but they feel that "the effects of the existing partition of the field between voluntary and local authority enterprises (with all the potential impediments to easy coöperation and the possible clash of interests inherent in such a situation) should on no account be intensified by the permanent intrusion of a third hospital authority." They therefore advise that the hospitals should be handed over to one or other of the existing types of authority. Since the responsibility for providing adequate hospital facilities in the region is to fall on the local authority, the hospitals should normally, they think, be transferred to such authorities, though not necessarily to the local authority of the area in which the hospital happens to be situated. However, they think that local circumstances may sometimes make it preferable to allocate an emergency hospital to one of the voluntary bodies or perhaps to a voluntary body acting in conjunction with a local authority. Terms of transfer, they consider, should be easy because the siting and design of many of the EMS hospitals were conditioned by necessity rather than choice, and because at the time of handing over they will no longer be in mint condition. They note, too, that the fabric of these hospitals "will, with proper maintenance, retain its utility for anything up to half a century," and that the buildings when obsolete can be scrapped with equanimity.

COÖPERATION BETWEEN HOSPITAL AUTHORITIES

The main problem—that of providing a basis of coöperation between voluntary and municipal authorities—could not be so easily solved; and the committee acknowledge the tentative nature of their conclusions in the phrase: "We realise . . . that our recommendations may themselves speedily be in need of change."

The development of the voluntary hospitals from purely charitable foundations to institutions subsisting in part by the contributory and provident schemes of patients is reviewed, and they point out that the main implication of the term voluntary is that such institutions are not governed by any agency of local or central government, but usually by boards of management composed of prominent people and of representatives of various interests. These interests include bodies of subscribers and industrial contributors' organisations. Any attempt at coördinated action between voluntary and municipal hospitals, in their view, must be attended by changes in the present system in both. Thus voluntary hospitals must begin to pay those members of the medical staff who at present give voluntary service: for it is felt that nothing would be a "greater impediment to the idea of partnership and reciprocity . . . than the persistence . . . of a situation in which doctors were or were not paid for their services according to which class of hospitals they serve." In the municipal hospitals the hierarchical system should be modified, and the committee suggest that at any rate the senior medical staff should have independent access to the governing body of the hospital.

REGIONAL COUNCILS

As the main instrument for carrying out the accepted policy the committee proposes the regional council. The regions should be defined, they hold, by the Secretary of State, though their own suggestion would be for five regions, pivoting on the four medical schools and Inverness. They see the councils as purely advisory bodies, exercising influence, not power. This limitation is necessary, they believe, because the duty of ensuring adequate hospital services will be laid on the local health authorities; and it would be difficult, they feel, and perhaps impossible, "for local authorities to transfer to these regional bodies the executive responsibility which will be imposed upon themselves."

The proposed composition of the regional council deserves careful note. The committee suggest that the local authorities and the voluntary hospitals should have equal representation on them, and that there should be a chairman independent of both parties, nominated by the Secretary of State. They suggest twelve representatives each from municipal and voluntary bodies, appointed by these bodies themselves, and a small group representing the medical and medical-educational interests of the area: these last perhaps to be assessors rather than voting members. Thus the voluntary hospitals would have equal representation with the local authorities on a regional council exercising influence. The local authorities would exercise power in virtue of the statutory duties laid on them to provide an adequate service; and would also have equal representation with the voluntary bodies on the regional council.

The committee further suggest that the regional council should influence the choice of candidates for the more permanent posts in both voluntary and municipal hospitals through a regional appointments committee. The final choice would lie with the hospitals themselves. Some special provisions for the large South-Western Region, relating to the appointment of sub-regional councils, involve no differences of principle and need not be set out at length here.

The committee as a whole did not favour the establishment of a national consultative council, though there

1. Report of the Committee on Post-war Hospital Problems in Scotland. Cmd. 6472 HMSO. Pp. 44. 9d.

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were four dissentients out of the eleven committee members.

FINANCE

The report sets out clearly the reasons why the voluntary hospitals, as well as the local authorities, will have to look to the state for some part of their support in the postwar world: in their view, "under postwar conditions it will be impossible for the voluntary hospitals to continue to offer the volume and range of services which they offered in 1938–39 on the sources of income then available to them." There are several reasons for this change in the financial position of voluntary hospitals. Their expenses will be increased not only by the rise in cost of materials but by salaries payable to the medical staff, and higher standards in the pay of nurses. Charitable donations are likely to fall off with the establishment of a universal insurance scheme; for as the report puts it, "even the charitably disposed have no passion for giving money merely to relieve rates and taxes." There will therefore be little motive for making gifts unless they can be earmarked by the donor for a distinctive purpose. The committee recommend a compulsory contributory scheme for the public, co-extensive with whatever social security arrangement may be introduced; and they condemn "any methods of payment involving the assessment and recovery of charges from patients at or near the time of actual treatment." They assume that the fund created by this levy will have to be supplemented from other sources. The insurance offered should, in their view, include maintenance as well as free institutional treatment.

They propose rather a complex method of financing the hospitals. The contributions of the insured would form a central hospitals fund, and this would be supplemented by an Exchequer subsidy; and this fund should be capable of meeting 60% of the total cost of services provided in the voluntary hospitals and the corresponding municipal general hospitals. The distribution should be related to the services rendered, and claims for payment would be made to the Department of Health. This arrangement would cover all the financial relations between voluntary hospitals and contributors or patients. The financial relations between voluntary hospitals and local authorities would follow a different plan. It is assumed that health authorities will be authorised to provide additional services but also to provide financial aid to voluntary hospitals for work done by them within the approved hospital scheme; and towards both kinds of expenditure the authorities will receive an Exchequer grant. The committee suggest that the authorities in each of the five regions should be required to pay annually a sum calculated on the rateable valuation of their areas, or on the basis of population, and that the fund so formed should be distributed in each region by a small committee appointed by the Secretary of State. Alternatively an Exchequer grant might be made directly to the voluntary hospitals and distributed by the proposed committee.

Sir Hector Hetherington, in a reservation to the report, regards these proposals as too complex; and suggests that there is a good case for a state grant payable on a bed-complement formula to every qualifying voluntary hospital. This, he thinks, would entail disappearance of both the state supplement to the contributory fund and the special state grant. Under the arrangement he proposes, the local authorities would budget on the usual pattern: expenditure would depend on the standard of service which the authority provided; income would consist of payments from the central hospitals fund, from rates and from government grants. Voluntary hospitals would get their income from permanent endowments, payments for service from the central hospitals fund and an Exchequer grant calculated on bed-complement; any deficit would have to be made up from voluntary contributions and by grants from the local authorities—which of course would attract to the local authorities a proportionate share from the Exchequer.

Two other smaller points in the report are worth noting. The committee specifically recommend that in determining the financial position of the voluntary hospitals for the purposes of the local authority grant, a proportion of strictly charitable or voluntary income should be left for development. In other words, the voluntary hospital will not have to draw in its horns and reduce expenditure to a minimum: it is still to carry on its traditional task of extending the study and practice of medicine—a task in which the municipal hospitals are now beginning to share. The report also recommends that where adequacy of standard of service in a voluntary hospital is in question, the local health authority should be able to ask the Department of Health for Scotland to undertake an expert impartial investigation.

THE CLYDE BASIN EXPERIMENT

IN an attempt to prevent the breakdown of war-workers this experiment was launched at the beginning of 1942. The idea was that general practitioners should be invited to refer for further investigation young workers about whose health they were concerned; sometimes the reference was prompted by industrial medical officers whose coöperation had been sought.

In its early stages the experiment was confined to workers under the age of 25 and to the densely populated Clydeside area. Patients so referred were examined by consultants where necessary, and if it was felt that further investigation was indicated, they were admitted for it to hospitals of the Emergency Medical Service. Patients requiring a period of convalescence to prevent breakdown in health were sent to one of the country houses functioning as auxiliary hospitals in the Emergency Hospital Scheme. Cases referred for examination under the scheme were often found to be suffering from these conditions of debility and vague ill health that severely prejudice well-being and working efficiency without necessarily causing complete breakdown and absence from work.

The experiment was a success. In the course of a year it dealt with some 1400 young people and at the end of the year it was extended to cover workers of all ages in the entire Scottish industrial belt; by the end of last June the total number of persons dealt with had risen to 4126. A detailed analysis of the first 1240 cases is presented in a brochure issued by the Department of Health for Scotland,[1] which shows that their ultimate disposal was:—

	Males.	*Females.*	*Total.*
1. Failed to appear	34	45	79
2. Hospital waiting-list cases	17	6	23
3. Referred to local authority for further action	15	17	32
4. Alternative occupation suggested	45	34	79
5. Fit for own work	77	87	164
6. Unfit for work	45	82	127
7. Others	3	1	4
8. Sent to convalescent home	44	125	169
9. Sent to base hospital	221	342	563
Total	501	739	1240

Among the conclusions drawn by the Department from a general review of the experiment are the following:

1. There is need for facilities such as are provided under the scheme, though not necessarily on exactly the present lines—admittedly experimental.

2. At present too many of the cases of fatigue carry on until unfit for work when the period required for return of capacity is prolonged. More adequate facilities for ordinary (e.g. weekend) rest and recreation would help to prevent some of the conditions found.

3. Much of the vague ill health encountered was due to long hours of work, travelling difficulties and inappropriate dietaries as is evidenced by the large proportion of cases without serious organic disease.

4. The vast majority of the patients sent for convalescence have benefited by the rest and change provided. The removal of fears of serious disease by complete medical overhaul provides the reassurance so helpful in expediting recovery.

5. The hospital reports must be of value in affording to the patient's own doctor a useful background not only for present but for future reference.

6. The proportion of cases with early organic disease elicited in the course of hospital investigation but not detected by ordinary clinic and specialist facilities is small. Where institutional admission can be most helpful in such cases is mainly in the elucidation of causal factors.

1. Health and Industrial Efficiency: Scottish Experiments in Social Medicine. Edinburgh. HMSO. 1943. 1s.

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7. Certain difficulties have been encountered—difficulties in securing full realisation of the potential value of the scheme, alike in relation to the well-being of the patient and his working efficiency. It is not easy to arouse enthusiasm for a scheme that is essentially preventive in its approach.

The Department notes, however, that it has come to be realised, to an extent seldom appreciated in time of peace, that the disabled man may be a potential asset, even where complete restoration of function cannot be secured—provided always that to the best efforts of medicine are added an enlightened industrial approach and a determination to place the disabled in suitable work. This growing recognition of the essential relationship between health and industrial efficiency is one of the valuable outcomes of war, one of the present gains that surely must not be lost in times of peace.

ARMS PRODUCTION AND THE MAN

Sir WILFRED GARRETT, reporting as HM chief inspector of Factories [1] says that the outstanding feature of last year was the more important position assumed by women in the industrial structure of the country. In many respects this has made for the improvement of factory conditions: it has led to "a remarkable stimulation of public pressure for better standards of washing and clothing accommodation, and a higher standard of cleanliness throughout all the amenities and in the workrooms themselves."

Dr. E. R. A. MEREWETHER, who has succeeded Dr. J. C. Bridge as senior medical inspector, believes that as far as the major specific causes of industrial sickness are concerned there is no cause for alarm but rather the reverse. On minor non-disabling sickness it is harder to be definite, for the records are inadequate and one must rely on personal impressions.

"One of these is that minor septic conditions like boils, are increasing, as also is the affection which came to be known as 'trench mouth' during the last war. This points to some slight reduction in tissue resistance, due to several causes acting solely or jointly. Fatigue from an over-zealous desire to get on with the job, or rather the several jobs which are our individual lot today, may be one, particularly when individual personal worries or strain are added to the daily effort."

"Undue and cumulative physical fatigue due solely to hours and conditions of work is not generally a deleterious factor in the healthy adult under present conditions; but there is a limit to the secondary jobs which can be taken on in addition, however enthusiastically they are urged, and however willingly they are accepted. The physically immature and the older sections of the community must be watched in this connexion, and particularly the hours of work of the former."

Miss ISABEL TAYLOR, deputy chief inspector, describes an investigation into the actual hours of work of young persons in all types of factories in representative industrial centres. Of "young persons" over 16, it was found that 85% of the boys and 89% of the girls were working 54 hours or less, while 48% of the boys and 55% of the girls were working 48 hours or less. Of those under 16, 30% of the boys and 37% of the girls were working 44 hours or less, while the remainder (except a very small number employed illegally) were working between 44 and 48 hours.

Examples are again given of the effect of changing hours of employment:

In a small factory in Birmingham which had returned to their normal working hours of 47 for the males over 16 and 44 for those under 16, the output was as high as when 54 and 48 hours respectively were worked.

In a factory in the Black Country men had been working on the day and night shift system, averaging 52½ hours a week. They changed on to three 8-hour shifts, six turns a week, making a working week for each member of the shift of 45 hours. The output of each of these shifts was equal to what it had been in the 52½ hour week.

A firm of toolmakers in South London began to employ women and decided to reduce the hours of the men, by dispensing with Saturday afternoon employment, to 55 a week in order to make them coincide with the hours of the women. At the same time they changed the system of payment from a weekly to an hourly basis in such a way that the amount earned by each man was not altered by his shorter hours of work. The result has been most satisfactory. Production has, with the shorter hours, if anything slightly increased.

The year 1942 saw a remarkable increase of part-time workers. Most of these are women with household responsibilities, or men and women who have retired; but some are people like teachers and students who give some of their spare time to factory work. "Opinions vary as to the quality of the part-time workers, but on the whole the system seems to be working very successfully. In some cases the hourly output is said to be greater than that of full-time workers and the lost time less."

Generally speaking the most popular arrangement of the hours of part-time workers is that of morning and afternoon shifts, usually of 4–5 hours; but there are many variations. Thus in a nut and bolt works 40–60 married women are employed on a night shift between 10 PM and 6.30 AM, working for three nights a week. This arrangement is said to be satisfactory to the mother because her husband can be responsible for the children during the night and she can give the family breakfast and see them off to school before taking her day's rest.

Miss Taylor quotes a case in which "women" 14 and 15 years old were found to be working nearly 60 hours a week and on Saturday afternoons and Sundays. Inspectors, she says, have usually been well supported by magistrates in cases which it has been necessary to bring before them; "and this support seems to bear out our general impression that public opinion, no less than the opinion of those who are immediately concerned in the factories, is tending more and more to depart from the view that in war-time long hours are themselves a virtue."

1. Annual Report of the Chief Inspector of Factories for 1942. London. HMSO. 9d. (Cmd. 6471).

A GIFT FOR PATHOLOGY

Mr. W. H. Collins of Wexham Park, Bucks, has given £100,000 to the Royal College of Surgeons of England for the endowment of their department of pathology and the institution of a chair of human and comparative pathology there. In his will he has made provision for a bequest of a further £100,000 for the endowment of the department of anatomy and for the institution of a chair of human and comparative anatomy. In announcing the gift to the college, Sir Alfred Webb-Johnson, the president, read the following letter from Mr. Collins:

"MY DEAR PRESIDENT,—Throughout my career I have realised how essential is the study and investigation of basic problems. Success of armies in the field is dependent on careful planning and preparation at headquarters, and victories in the war against disease can only be achieved by due applicationand increased knowledge of the fundamental medical sciences. I have been greatly impressed with the value of the departments of anatomy and pathology which have made the Royal College of Surgeons of England famous all over the world. I have seen what grievous injury your departments have suffered as the result of enemy action and appreciate what a gigantic task it will be to restore them to their unique position in the scientific world. To embark upon this task it is essential that the departments shall have an assured income. . . I trust that my gifts will enable the council to proceed with confidence with their responsible task and to engage the services of men of outstanding ability to assist them in their labours."

Mr. Collins is chairman of the King Edward VII Hospital, Windsor, and of the voluntary hospitals advisory committee of the Berks and Bucks Divisional Hospital Council. He is also a vice-president of the Middlesex Hospital and has built, equipped and endowed the X-ray diagnosis department there.

ROYAL SOCIETY OF MEDICINE.—On Monday, Oct. 25, at 4.30 PM, Mr. Harold Chapman, LDS, will deliver his presidential address to the section of odontology. He will speak on prognosis in orthodontic cases. On Oct. 26 at 4.30 PM at the section of medicine, Dr. Geoffrey Evans will give his presidential address on mental health, and Surgeon Captain Desmond Curran will open the discussion which is to follow. Mr. E. W. Riches is to give his presidential address to the section of urology on paralysis of the bladder on Oct. 28 at 5 PM.

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In England Now

A Running Commentary by Peripatetic Correspondents

IN the mad hurly-burly of medical plotting and planning, now so rampant, the silence of the Board of Control is intriguing. This once august body . . . How often in the olden times were we private asylum wallahs solemnly instructed that THE BOARD, so sensitive and so jealous of its name, might be easily confused with those other liquor and betting groups if the all-important "THE" was ever omitted! This ancient self-sufficient authority . . . How happily I remember my first encounter when as a very young medical officer I was commanded to present myself (in those days we had to be formally inspected by a member of THE BOARD before we could join for duty) and was received as if I were the heir of all the ages. Then, later, those other encounters with the legally courteous Trevor, and the clinically confident Needham (great names to us in the asylums) and that terrible medical superintendent from somewhere in the Midlands who, in keeping with his name, rejoiced to boil us alive, like they did lobsters in the kitchens of the Cecil, until we went red all over and shrieked our annoyance, whereat he would jab us with his trident wit and we poor fish . . . Ah, well! times certainly have changed. Which reminds me that only the other day I was with a neighbouring colleague of many years of senior service when the arrival of two visitors of the Board was announced: "Shades of the Great Consultants!" he groaned, "an assistant medical officer and a school teacher! Last year we had a hospital matron and a social worker, next year I have no doubt it will be an occupation therapist and a lay psychologist." "Hey!" he called back over the 'phone, "I'm out! Ask the matron and Dr. C. to take 'em round." Dr. C., he explained, was the holiday locum. But, where am I? O yes, that once august body, that ancient self-sufficient authority, THE BOARD OF CONTROL, will it seek to regain something of its pristine splendour in the new worlds now a-making? The Board is older than the Ministry of Health, in which today it plays but a minor part. Long before the Ministry was formed the Board managed its own affairs and was a law unto itself. In that new and mighty commonwealth of the Ministry-To-Be could not the Board demand dominion status? It could. It could become the Department of Mental Health in the new Ministry. Enlarged by the addition of medical men of proved organising ability and administrative experience, it could take over all the mental hospitals and mental deficiency institutions from the local authorities and embody them in one comprehensive service for the whole country. It could coördinate all the mental welfare and mental after-care work now being done by voluntary associations and eventually absorb such activities into the national mental health service. It could . . . There's that telephone, and I've been caught napping again! Why does one grow old—and dopey?

* * *

TO ANY VIRUS

Art thou our father, infinitely small,
who first snatched life from earth's insensate crust,
still held by stricter laws that govern dust,
dissolved or crystallised, yet siring all?
Or art thou just some catalyst that grew
jealous of life, a vengeance on its pride,
death to the upstarts, death which never died,
humbler of human pomp—ten milliμ?
Secret of life, or death? Would God I knew!

* * *

Is there anything else in surgery so dramatic as cæsarean section? After taking part in many a score I still feel that thrill when the infant is delivered that I felt the first time I saw it. Other operations may be life-saving: this has the appearance of life creating, a surgical miracle. Surely if one wished to show a layman the sensational possibilities of a surgical operation, it is to cæsarean section that he should be conducted. He sees on the operating table an amorphous towel-clad mass, presumably human and feminine though he can distinguish nothing to tell him that. A few strokes of the surgeon's knife, a gush of fluid, the hand pushed in where the fluid came out and next minute an infant is squeaking on the tray which a nurse has ready. Our last operation of this kind produced the largest infant in my experience. He weighed over 13½ lb., and moreover he was, unlike many of the newborn, a comely infant; he looked for all the world like an exaggerated Rubens cherub. A few days later I had a chat with the mother. She was a woman of ordinary stature, and said that her husband is a little man, "but," she added, "my own father is a very big man." So the infant harked back a generation for his splendid inches.

* * *

This year the hospital has been even more vegetable minded than last, when we had our first vegetable show. In addition to the old campaigners the theatre staff got busy early in the spring on a patch which hitherto had been rather a no-man's-land. Theatre sister was heard to complain at planting time that her site got no sun until the afternoon and was not really consoled when someone pointed out that double summer time would soon cure that. However the marrows, beans, peas and lettuces which later rewarded the labours of her team amply repaid their efforts. G Ward had a good crop of garden peas, and the high spot was provided by the convalescent small boys who picked a good basketful of peas and having de-podded them stuck a label on the basin with the inscription, "There are 605 peas in here." At the middle of August our second annual show was held. Entries were good—almost double last year—and the 3*d.* entrance fee has benefited the War Savings Campaign by over fifty shillings. Prizes were well distributed, and the exhibits, many of them much better than last year's, provided several difficult problems for the judges. Onions, shallots and runner beans went to the physicians, lettuces to the lady almoner, and root crops—carrots and parsnips—to the senior stoker. The RMO's beetroots were adjudged best of a very full entry; potatoes too were abundant and good, and the prize fell to one of our lady porters, who also carried off the outdoor tomatoes after a terrific contest with the ENT surgeon, who was placed second in this class, winning by a split pip from a representative of the VAD. The dispensary carried off the peas, with a couple of seconds for carrots and beetroots as adjuvants. A little heartburn was felt by the massage department, whose shallots, grown in a very rough plot near the prewar rubbish tip, did not sufficiently overcome this handicap to reach prize-winning standards. Some of us thought that more use might have been made of physiotherapy to stimulate these shallots, and likewise the X-ray department's carrots, unkindly dubbed carrotlets by a candid critic. The wards had a competition of their own—for the best arranged bowl of cut flowers. These, with the collections of wild flowers, provided the centre table with an attractive decorative palliative to the smell of cut onions.

* * *

In the medical room of our Recruiting Board I heard an unseen clerk telephoning: "That you, Tom? 'Ave you got the NS 1 of a bloke named Cyril 'Igginbotham there? 'E was boarded December '41 and put in grade 3. 'E applied for regrading last week and was passed grade 1. We've got his mother 'ere. She says as 'ow 'e's crackers, says 'e only wants to join the Army to get a gun to blow 'is brains out." Pause. Then. "What's that you say, Tom? Best thing that could 'appen to 'im. Let it go through? OK, Tom. Just as you say."

* * *

Shall we be wise enough to learn the lesson which the EMS hospitals are teaching—that the day of the massive city hospital is over? The ideal unit is the general hospital of simple design, built in country surroundings near the town, and associated with a casualty department in the centre of population. Anyone who dares to build or add to one of the existing "barrack" hospitals in our cities is sinning against the light.

* * *

News of medical discoveries before the war was flashed round the world and elaborated in the rapid and free circulation of medical publications at a speed which was sometimes embarrassing. At a time when not every doctor in this country was employing the new sulphonamide drugs, I have been told that the Kikuyu tribe in Kenya decided to sell some of their tribal cattle and buy

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sulphonamides for the treatment of the gonorrhœa said to be prevalent among them. Now, therefore, that penicillin is a household word in medical circles here,—though yet very far from a household article—it is somewhat startling to learn that in Switzerland penicillin has apparently only just peeped over the horizon. In a copy of *Médecine et Hygiène* published at Geneva on Aug. 25, there are Exchange messages from London and Washington announcing in a few lines the discovery of penicillin, followed by an editorial note that "We shall keep our readers informed of the new discovery, *should it prove interesting.*" Switzerland was before the war a nodal point for the exchange of medical information, but the old definition of the British Isles as "a piece of land entirely surrounded by sea-sickness" might now be applied, with a difference, to Switzerland.

* * *

I am a shocking correspondent, yet I like to keep in touch with my friends. Consequently it was my habit to write to most of them each New Year's Eve. In these letters I used to browse over all the good things that had happened to me during the last twelve months. And in those wondrous prewar days what glorious things I had to tell each New Year's Eve. Turning up copies of those letters I find that now and awhile, writing to a colleague, I would wax enthusiastic over some new-found point of technique or over some diagnostic difficulty overcome, but most of the space seems to have been devoted to accounts of holidays. Oh! those wonderful holidays, from each one of which I would return vowing it to be the very best of them all, only to find next year that the same thing was true all over again. They would keep me busy night after night during the winter, for I held strongly that a successful holiday must always be a planned holiday, requiring prolonged research with every sort and scale of map, with a guide-book, time-table, and even with prospective menu. For I find in those letters much mention of food, hushed tales of a truffle-stuffed paté in Périgord, of a bouillabaisse eaten on the waterfront at Marseilles, of a wonderful steak that we ate beneath the shadow of the palace at Avignon, a Chateaubriand with the faint smoky flavour of the charcoal fire, of a certain Asti, ice-cold, under the olives above Orta, and of a Montrachet that lured us, bottle after bottle, through a stifling night in Nîmes. Looking over those annual letters, copies of which I kept as a kind of diary, I find mention of so many lovely things, of the bent pines along the old Appian Way outside Rome, as it was before the days of Mussolini, the dark woods above Fiesole, the wild excitement of my first view of the New York skyline, of long days spent with a rucksack in the mountains, of blue sailing days on the Helford river, of Dartmoor in August, where the wind is soft and honeyladen, where the heather is purple like the blood of saints, and of my first sight of Westward Ho! when I went round in "two over" in spite of a caddy who lashed me with his tongue from first tee to last green.

But now that the days bring us neither the leisure nor the will to relax we have "no time to stand and stare." Nor is there time to linger over good food and wine, talking to friends. We can but adopt the attitude of the very old, who exist without hope for the future, with little interest in the present, who can but brood everlastingly over the past. And what memories I have to gloat over—a procession of magnificent holidays of which those letters remind me. They brought me the years that we went to France, walks in the Pyrenees, land of pelota and of folk-dancing, long sundrenched days in Provence, hot sand and shining sea, the occasional before-breakfast bathe from the deserted cove, cool under the early morning haze. Then the Tyrolean years with the mountain inns of the Zillertal, where they dance and sing in the long evenings, and give you "Gruss Gott" as you pass, the wild strawberries and the flowers of the upland valleys, the unforgotten smell of the chalets, blended of wood smoke and cattle and the damp earth, the cold of the woods as we started to climb at dawn, and at night the warmth of the Weinstube where we ate vast meals, Wiener schnitzel and fresh cranberry sauce, and nodded over the beer after long days in the mountains. Then the years that showed me Spain, perhaps the best of them all, that gave me the love of my life, the bull ring, with its magic and beauty, its music and colour and movement, its splendour and bravery beyond belief, Spain and the mountain road that led to Pamplona, the heat of Granada, the fiesta at Seville where first I saw the wonder that was Juan Belmonte. So lovely were those years, and so bitterly do I regret the gladness that life lacks today, that I wonder whether perhaps it would have been better never to have tasted those delights, and whether the old adage that it is better to have loved and lost than never to have loved at all is not a bitter lie.

* * *

It was tactfully pointed out to one of the girls attending the hygiene class that not only should she keep her nails clean on general grounds, but in a hygiene student it was particularly . . . and so on. Next week the ebony rims were gone. "Thanks for the tip," she said to the instructor, "they look much nicer now I use my sister's toothbrush on them."

Public Health

From the Annual Reports

THROUGHOUT Britain the year 1942 was remarkable for its low incidence of infectious diseases and freedom from epidemics. The incidence of measles is a measure of the numbers at risk; its fatality has been reduced enormously. Attacks of whooping-cough appear to be fewer than those of measles in the proportion of two to three, but owing to the difficulty of diagnosis in early childhood, in which whooping-cough is most frequent and most fatal, the true incidence is higher than that recorded and its fatality remains considerable. Few children seem to escape attack by both diseases but everything possible should be done to protect children from contracting these infections before they are three years old. Inoculation promises well for whooping-cough, but it must be done very early in life to cover the period of greatest danger. Diphtheria can of course be rendered practically harmless by immunisation and scarlet fever has ceased of itself to be much more than a nuisance. The epidemic of cerebrospinal fever is waning, but not as rapidly as had been hoped Its fatality can be reduced by treatment to about 10%, but it is doubtful if any preventive measure so far employed influences its incidence. Viewed as a whole the immunity of 1942 from infections has not been explained.

The present distribution of fatalities from diseases which are in theory largely preventable is illustrated in Dr. W. M. Frazer's report for *Liverpool*. In 1942 for every 100,000 population, 35 died from the seven principal zymotics; 97 from pulmonary tuberculosis; 18 from other forms of tuberculosis; 204 from respiratory diseases, and 191 from cancer. In the decade 1871–80 the percentage of total deaths due to infections (less diarrhœa, influenza and tuberculosis) was 19·2; it is now 5. From tuberculosis the percentage has been reduced from 13·5 to 8·3, whilst from cancer it has increased from 1·4 to 13·6. The total crude death-rate is now less than one half what it was 70 years ago. Cancer deaths in Liverpool in 1942 totalled 662 males and 617 females. Female reproductive organs and breasts accounted for 230, but in all other sites, except liver and skin which together caused 22 male and 24 female deaths, males suffered much more heavily than females, most noticeably in the lungs (147 males and 38 females). Only one case of poliomyelitis and none of encephalitis lethargica was notified in 1942. There were 5 cases of anthrax, all treated with serum and neoarsphenamine, and all recovered. In a series of 100 cases treated in Liverpool since 1924 there were 7 deaths, but all the last 50 cases recovered though some of these were very severe and in most dangerous sites. Excision was not done in any case. Liverpool keeps a register of known typhoid and paratyphoid excretors. At present there are 8 names on the register, all excretors of *paratyphosum B* and all but one are females. The longest case has lasted for over six years. The number of diphtheria inoculations completed was 27,368, three times as many as in any previous year and more than double the number of births (13,729) registered in the year.

Dr. T. Lloyd Hughes reports epidemic prevalence of bacillary dysentery in *Middlesbrough* with 265 notified

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cases (organism not stated), of which 258 were admitted to hospital with 12 deaths. Also 40 deaths from infantile diarrhœa occurred in 1942. No medium of spread was discovered; "it was concluded that whatever the source of infection the disease in the main was actually spread by personal contact." Sulphaguanidine was used with success in treatment and for freeing carriers. Diphtheria gave 544 notified cases with 38 deaths, a heavy toll in a population of 140,000. At the clinic for scabies 1275 persons were treated, of whom 1262 were school-children. Arrangements were made to deal elsewhere with adults and youngsters, but in Middlesbrough, as in other places, though the provision for the detection and suppression of scabies is highly efficient for school-children it is not so for the remainder of the population; hence the disease continues, though it may have ceased to increase.

Parliament

FROM THE PRESS GALLERY

Health Services in Coal Mines

OPENING the debate on the coal-mining situation in the House of Commons on Oct. 12 Major G. LLOYD GEORGE, Minister of Fuel and Power, said that progress had been made in the health services during the last year. Provision, long overdue, had been made for the rehabilitation of injured miners. A mines medical officer had been appointed in each region. Inquiry continued into the methods of treating pneumoconiosis and measures for preventing the dust which was its cause had made satisfactory progress. There was now hardly a miner who found it impossible to have some sort of meal at a canteen and for most of them it could be a hot meal. Questioned as to the proportion of miners using the canteens Major Lloyd George admitted that at many canteens the attendance was not very satisfactory. The figures were about 25–30%. From his own experience he knew this had nothing to do with the quality of the food. There was the same sort of difficulty with pit-head baths. He thought we must try to break down this prejudice a little more quickly.

Winding up the debate for the Government on the first day Mr. TOM SMITH, one of the joint parliamentary secretaries and himself an ex-miner, pointed out to his mining friends the progress made in promoting their health, welfare and safety. The Minister had insisted from the beginning that there should be no sacrifice of safety measures in the hustle of war-time production, and the accident-rate had been reduced. This year there had been 542 men and lads killed, a big figure, he admitted, but for the same period last year the figure was 689. Progress had been also made in treating fractures. In 1938 only 1% of these cases were treated by rehabilitation methods; today there were 8 residential centres and facilities were provided in every colliery district. It was good to hear from patients themselves that they were making remarkable progress towards recovery. The Government were very conscious of the problem of workmen's compensation in the mining industry, because for every man injured in a factory six were injured in the pit. A lot was being done to improve the miner's lot and more could be done. But if the collieries were made more attractive and the miners were spared what they went through after the last war Mr. Smith honestly believed that we can find men to work in the pit and give the country the coal it needs both in peace and in war.

QUESTION TIME

Future of Medical Practice

Dr. RUSSELL THOMAS asked the Minister of Health what steps he had taken to ascertain the views of doctors serving in the armed forces both in this country and abroad in regard to the future of medical practice.—Mr. E. BROWN replied: I am alive to the need for this, but the appropriate time will be when the white-paper has been issued as the basis for public discussion. Dr. THOMAS: Is it not a fact that no steps have been taken to ascertain the views of about 30,000 doctors connected with the Armed Forces? Would the Minister give a political assurance and guarantee, similar to that of the Prime Minister yesterday in the case of coal, that the medical profession will be protected? Mr. BROWN: The proper time to deal with that matter will be when the white-paper is issued. The country and the House will then be able to express an opinion.

Dr. EDITH SUMMERSKILL: Are we to understand from the answer that the Minister has taken advice only from the older doctors, and not from the younger ones, who are in the Services, and who will be called upon to administer the medical service?—Mr. BROWN: I have pointed out that the time to deal with these questions will be when the white-paper is before Parliament.

Sir ERNEST GRAHAM-LITTLE asked the Minister whether he was aware that the representative body of the British Medical Association had in 1942 and 1943 recorded almost unanimous opposition to the establishment of any whole-time salaried state medical service to the extinction of private practice, as proposed in assumption B of the Beveridge report; that similar opposition had come from numerous plebiscites of the profession; and whether he still adhered to his declaration at Westminster Hospital, on Oct. 4, that the Government had accepted assumption B and was engaged in putting its provisions into operation.—Mr. E. BROWN replied: The answer to the last part of the question is yes. But assumption B does not contain the proposal described—nor does it purport to deal at all with the method of organising the new service.—Sir E. GRAHAM-LITTLE: Will the Minister contradict the statement which he is said to have made that this matter has been determined already and that it is actually being put into operation?—Mr. BROWN: I have never said that.

Dr. RUSSELL THOMAS: Is the Minister aware that more than 90% of the profession have recently turned down the matter, and that they are particularly disturbed at the Socialistic scheme he brought forward at the outset?—Mr. BROWN: The hon. member is now repeating what he said on the adjournment, with not very great satisfaction to himself.

Mr. W. GALLACHER: Is the Minister aware that the national health service is more important than the opinion of a few private practitioners?—No further reply was given.

Medical Examination of Prospective Employees

Mr. RHYS DAVIES asked the Minister of Labour whether he was aware of the growing practice of employers to engage medical officers to examine prospective employees; that this practice tended to transfer the determination of employment into the hands of the doctors, increased unemployment and must create a pool of permanently unemployed persons especially if the medical fitness required was of a progressively high standard; and if he would consider this problem.—Mr. ERNEST BEVIN replied: It is my policy to encourage the greater use of doctors' services in industrial establishments in the interest of the medical welfare of the employees. I have no evidence that this is leading to the imposition of unnecessarily high standards of physical fitness in prospective employees. Mr. DAVIES: Will the Minister inquire whether pressure is brought to bear on employers by the premium insurance companies dealing with workmen's compensation, so as to avoid compensation risks by throwing out certain persons who would otherwise be eligible for employment?—Mr. BEVIN: I could not undertake an inquiry at this stage.

Mr. J. J. TINKER: What steps does the Minister take if a man does not pass a doctor to provide suitable employment?—Mr. BEVIN: If a man passes out through injury or is unsuitable to go back into employment I take him over immediately for training for some other employment.

Regulation 33B

Replying to Mr. GRAHAM WHITE, Mr. BROWN said that regulation 33B is substantially helping local authorities to get into touch with persons suffering from venereal disease and to induce them to undertake treatment. Up to June 30 last 1893 cases were brought to the notice of medical officers of health in this way. The number of cases reported more than once as alleged sources of infection was 110. In 3 cases it was necessary to take proceedings for failure to carry out treatment.

Dr. SUMMERSKILL: In view of the fact that only 6 men had been reported under regulation 33B, is the Minister satisfied that this regulation is making a satisfactory contribution to the reducing of the incidence of venereal disease?—Mr. BROWN: I would say that it is making a very useful contribution.

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Diphtheria Notifications

Returns from local authorities in England and Wales between Jan. 1, 1940, and June 30, 1943, show that among approximately 107,000 children who were notified during those periods as suffering from diphtheria approximately 9500 in the aggregate had completed the course of immunisation. The returns for the year 1942 show that among approximately 1530 children known by local authorities to have died from diphtheria in that period 41 had completed the course of immunisation. The corresponding provisional figures for the first six months of 1943 are 600 and 21. (Mr. BROWN replying to Mr. S. V. VIANT.)

Miniature Radiography Units

Miniature radiography units have now been supplied in England to the county councils of London, Lancashire, Middlesex and Surrey, and to the Staffordshire, Wolverhampton and Dudley Joint Tuberculosis Board. Another unit has gone to Scotland, and one is on the point of delivery to the Welsh National Memorial Association. (Mr. BROWN replying to Captain L. F. PLUGGE.)

Dried Milk in Flour

Mr. T. LEVY asked the Parliamentary Secretary to the Ministry of Food for what reason millers were required to incorporate ¾% of dried milk in the flour they produced.—Mr. W. MABANE replied: The fortification of flour with dried milk was introduced as an important means of ensuring that valuable nutrients reached persons needing them most.

Typhus among the Troops

Sir JAMES GRIGG, replying to a question, stated that during the last typhus season in North Africa there were 20 cases among British troops, of which 6 were fatal. Operations in Sicily occurred in the summer months and no cases have been reported from this area during the period. Some 30 cases of typhoid fever have been reported from North Africa.

Hospital Accommodation in Africa

In answer to a question Mr. P. V. EMRYS-EVANS said: The numbers of beds available for Africans in Government hospitals in the High Commission Territories are: Basutoland 254, the Bechuanaland Protectorate 128 and Swaziland 44. The ratio of beds to population is 1: 2600 in Basutoland, 1: 2076 in the Bechuanaland Protectorate and 1: 3483 in Swaziland. If the beds available in the mission hospitals, most of which are Government grant-aided, are included, the ratios are 1: 2000, 1: 1067 and 1: 1783 respectivly.

Facilities for treating Leprosy

Sir E. GRAHAM-LITTLE asked the Parliamentary Secretary to the Ministry of War Transport whether he was aware that the Universities Mission to Central Africa had been frustrated in the treatment of leprosy by the lack of essential drugs from India, which were held up by shipping restrictions, resulting last year in the closure for from 4 to 7 months of all centres conducted by the mission for treatment, with serious consequences for large numbers of patients; and whether he would take steps to relieve this position.—Mr. P. J. NOEL-BAKER replied: I understand the drug in question is hydnocarpus oil, supplies of which have hitherto been obtained by the mission from local medical officers in Tanganyika Territory. Recent inquiries addressed to Tanganyika Territory show that supplies of this oil are being received from India and are now adequate. I have no information in support of the suggestion that the difficulties last year were due to shipping.

Mr. D. N. PRITT asked the Secretary of State for the Colonies whether he had considered the report of the Cyprus trade-union delegation on the Leper Institution at Nicosia, stating that there was inadequate hospital and medical staff, insufficient supplies of sera, baths and other medical necessities, rice, oranges, eggs and milk; insufficient cash allowances to feed and clothe patients; that blind leprous patients suffered plagues of flies through absence of swing doors; that the guards put patients to hard labour and sold them food and other essentials at black-market prices; that there was no electric light, the cinema was used as a store and patients were not allowed to have a representative committee to put forward their requests and complaints; and what action he was taking in the matter.—Mr. EMRYS-EVANS replied: The Governor of Cyprus has been asked for a report on this subject.

Letters to the Editor

THE HEALING EDGE

SIR,—Your leading article of Oct. 9 on the fate of skin homoplasts ended with a reference to the work of V. B. Wigglesworth on epithelial healing by migration or sliding of cells from the edges of the wound, with mitotic division some distance from the wound to make up for the resultant thinning. Last year Dr. Pullinger and I called attention (*Proc. Roy. Soc. Med.* 1942, 35, 229) to the fact that this sliding of epithelial cells to cover a defect could be readily seen in pigmented rabbits after destruction of a portion of the corneal epithelium. These rabbits have pigment in the epithelium of the corneoscleral junction and the amount of sliding is easily demonstrated by the rapid movement of this pigmented edge on to the cornea to cover the defect. This fact was known to ophthalmologists and pathologists in 1898, but often seems to be ignored now. It is being studied in greater detail in this laboratory at the present time.

Wigglesworth's paper is a brilliant exposition of the process in the skin of an insect. He suggests that the stimulus for migration is a product of the damaged cells, while the stimulus for mitosis further away from the wound is the resultant stretching and thinning produced by the migration. He points out that simple trauma is more effective in producing migration than is injury by heat and considers that heat destroys the stimulating substance. In some cases after burns of the skin he produced mitoses at the edge instead of migration and hence slower healing.

I am fully in agreement with your leader that future work on healing skin and of grafts should include investigation of the position of the mitoses and the presence or absence of migration. It seems that just now when wound healing is such a live subject many workers are ignoring these curious facts.

Oxford. IDA MANN.

THROMBOCYTOPENIC PURPURA

THE IMPORTANCE OF SPLENCULI

SIR,—In their comprehensive and instructive article Dr. Evans and Dr. Perry have done much to clarify certain points in the ætiology and management of these very difficult cases. Is the spleen ever enlarged in essential or primary thrombocytopenic purpura? Their statement that "the spleen is not as a rule greatly enlarged; sometimes it is palpable, but usually not" calls for comment. In my series of 18 cases (Maingot, R. Abdominal Operations, London, 1940, p. 564), in which the diagnosis appeared to be irrefutable, the spleen was carefully examined and weighed as soon as it was removed from the body.

In all these cases it was found to be of normal size, of normal consistency and structure, and of average weight; in fact, each seemed to conform to the average healthy type of spleen. The immediate and late results in this small series were on the whole satisfactory, as 15 are alive and well today, some many years after splenectomy; 1 died of pulmonary tuberculosis two years after operation; 1 has slight recurrent hæmorrhages but is at work; and 1 succumbed from shock within a few hours of operation. Where an accessory spleen or splenculi were found, these were excised. In this group of 15 cases which were cured by splenectomy are 5 cases which were carefully followed up and reported by Dr. B. Myers (*Brit. med. J.* 1935, ii, 445 and 1942, ii, 466).

In 3 other cases, diagnosed and referred to me as instances of essential thrombocytopenic purpura hæmorrhagica the spleen was palpable before operation, and on being weighed after removal was found in each instance to be about double the normal weight for the age and size of the patient. Operation in each of these cases was a complete failure, and in the light of subsequent investigations these were obviously instances of secondary purpura hæmorrhagica. Personally, would not advocate splenectomy for a suspected case of thrombocytopenic purpura if the spleen can be felt below the costal margin.

It will be noted that in many of the cases which died, or in which the symptoms recurred after splenectomy, an accessory spleen or splenculi were found at operation. Alexander and Romanes (*Lancet*, 1929, ii, 21) contend that if the spleen is functionally or structurally deficient

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there is a compensatory hyperplasia of accessory splenic tissue. Hence, it is of the utmost importance during operation to search for and to excise accessory spleens whenever this proves feasible. The exception to this rule, of course, would be rupture of the organ, which naturally demands excision. In any case of essential thrombocytopenic purpura, or of acholuric jaundice (whether this be acquired or familial in type) where symptoms recur after removal of the spleen, the possibility of regeneration of an accessory spleen or of maleficent hyperplasia of splenculi should be borne in mind. It may even be advisable in certain recurrent cases to reopen the abdomen and to make methodical search by sight and by touch for cryptic remnants of splenic tissue, and if these are found and are capable of total ablation, this should be performed.

Milroy Paul (*Lancet*, 1937, ii, 74) classifies true accessory spleen into two types: in the first, the accessory spleen is a constricted part of the main spleen, to which it is bound by a band of fibrous tissue; in the second it is a distinct and separate mass.

E. B. Settle (*Amer. J. Surg.* 1940, **50**, 22) states that an accessory spleen or splenculi are present in 10–35 per cent. of all autopsies, and in individual cases the number of these varies from one or two to one thousand. These accessory spleens may be found: (1) near the hilum of the spleen; (2) in the gastrosplenic omentum (the commonest site); (3) in the splenocolic ligament; (4) in the great omentum; (5) beneath the peritoneal tissue along the course of the splenic artery and vein; (6) on the anterior surface of the pancreas; or (7) elsewhere in the peritoneal cavity.

Dr. Evans and Dr. Perry were obviously aware of the risk of recurrence associated with leaving these remnants undealt with, since such statements as "one died later, possibly of a recurrence due to hyperplasia of the accessory spleen noted at operation but not removed" and again "one case where it (splenectomy) failed, many splenculi were present" are self-explanatory. In their summary, however, it would perhaps have been wiser had they laid emphasis upon the important part that these bodies play in so far as prognosis is concerned following removal of the spleen for this disease.

Wimpole Street, W.1. RODNEY MAINGOT.

NOT SO DREARY

SIR,—The distressingly dreary story of a municipal hospital by your peripatetic correspondent of Oct. 9 would have been perfectly true here ten years ago, and yet under an enlightened local authority we have developed into a large modern hospital treating 10,000 inpatients and with over 100,000 outpatient attendances yearly. The special features I would mention are:—

1. Attractive colourful wards and outpatient department.
2. Appointments system for outpatients.
3. Daily visiting for inpatients.
4. First-class medical equipment (nothing has been refused by the lay committee).
5. A medical staff of fully qualified specialists (normally non-resident) with assistants.
6. Medical staff have complete clinical responsibility, freedom from censorship of publications, and a share in administration through a medical advisory committee.
7. Provision of specialised units for treatment and research—e.g., neurosurgical, acute respiratory, dietetic, genito-urinary, traumatic.
8. Well-developed ancillary services. Good convalescent home facilities. Occupational therapist.
9. Practical encouragement of research. Good reference library and forty medical journals. Liberal staffing of large modern pathological department. Full-time medical artist.
10. Provision for consultation with eminent authorities when necessary.

We are not unique, for there are already a number of municipal hospitals emerging from poor-law institutions into modern hospitals along these lines. There seems no doubt the hospital services in the country need expansion, and if this trend were accelerated many of the present deficiences would disappear. It is essential for all local authorities (if necessary with financial assistance) to strive vigorously to provide "good service" for their population. The competition of an expanded municipal service would probably obliterate many of the small and therefore inefficient voluntary units, leaving only those whose tradition and efficiency would continue to provide competition for us and stimulation for all.

Your correspondent comments on the fetish of municipal forms. Unfortunately, in the past, all public authorities have had to protect themselves with a heavy defensive armour (of forms and records) against the ready criticism flung by the public against their own rate-paid institutions. Like other heavily armoured bodies their movements have been slow and their clumsiness great. As the public gain confidence in their institutions they can gradually divest themselves of their protective clothing of bureaucracy and speed ahead.

Central Middlesex County Hospital, N.W.10. F. AVERY JONES.

CONDITIONS OF MEDICAL SERVICE

SIR,—At a meeting on Oct. 3 of the undersigned eleven doctors, nine of whom are general practitioners in Birmingham, the future of medical practice was discussed and the following points unanimously agreed to as being of fundamental importance both to doctors and the community.

1. It is of vital importance for the British Medical Association to give guidance to the Government by formulating a plan for any future salaried State Medical Service, and in particular it is of the utmost importance to settle in advance the question of salary in such a service. This meeting considered that a salary (based on prewar figures) starting at £500 a year and rising to £2000 would be acceptable to the vast majority of the profession.
2. To maintain the high standard of the general practitioner and to avoid the tendency for over-specialisation it was proposed that the salary of the specialist should not be higher than that attainable by the general practitioner by virtue of experience or higher qualifications.
3. As a safeguard against bureaucracy (*a*) administrative posts shall not command a higher salary than equivalent clinical posts; (*b*) no doctor in the service shall be deprived of his rights as a citizen—e.g., to stand for membership of local councils.
4. The health centre will regain for the general practitioner the stimulating atmosphere of his medical student days, and medical practice will be based on collaboration and coöperation with colleagues no longer in competition, and free from commercialism.
5. The assumption that a salaried service means lack of incentive was strongly refuted, and the fine work of clinicians in the municipal hospitals of the city was cited as evidence against this assumption.
6. Facilities for free choice in a salaried medical service, based on the health centre, will be greater than at present and will be limited only in the interests of the patient—e.g., by limitation of lists and geographical considerations.

We believe that a full-time medical service, containing these conditions of service, would be welcomed by all doctors who entered the profession as a vocation and who wish to practise under conditions which are best for both doctor and patient.

MARY H. BARROW. S. LEWIN.
C. C. BRADSWORTH. A. MARKSON.
R. C. L. BURGES. J. A. SCOTT.
URSULA COX. H. M. TURNBULL.
J. VERNON GRIFFITHS. A. WISEMAN.
Birmingham. B. HERBERT.

MYASTHENIA GRAVIS

SIR,—Recognition of thymic abnormality in about half the patients suffering from myasthenia gravis has suggested treatment by irradiation or excision of the thymus. Both methods have given encouraging results occasionally, but it is only four years ago that the report by Blalock et al. (*Ann. Surg.* 1939, **110**, 544) revived interest in the operation and was followed by numerous further thymectomies in the United States and in this country. Improvement, and sometimes apparent cure, has been the result in about a third of the published cases. The complete failure in the remaining patients remains unexplained. The age of the patient, the severity and duration of the disease, and the histology of the thymus give no clue to prognosis.

The explanation that failure is due to insufficient removal of thymic tissue is unacceptable. In many of the failures large and apparently complete glands have

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been removed. If we concede that small fragments may have been overlooked, we should still expect considerable temporary improvement, as in thyrotoxicosis after inadequate thyroidectomy.

I suggest that improvement might well be due not to thymectomy, but to the accidental removal of parathyroids in some patients. This would set up a state of latent tetany, counteracting the myasthenia. The favourable action of large doses of guanidine shows that tetany corrects the myoneural disorder of myasthenia. The well-known anatomical aberrations of the parathyroids, which may be found in the thymus and at other sites in the mediastinum and at the base of the neck, exposes them to injury or removal in some patients during thymectomy.

If this suggestion is correct, the serum calcium should be low in the patients who improve, and within the normal range when the operation fails. As I am unlikely to have an adequate number of patients to test this hypothesis, I bring it to the notice of those who have suitable opportunities. If investigation confirms my suggestion deliberate parathyroidectomy should obviously supersede thymectomy in the treatment of myasthenia gravis.

Basingstoke. L. P. E. LAURENT.

RELIGIO MEDICI

SIR,—In Dr. Douglas Guthrie's excellent and informative tercentenary tribute (in your issue of Oct. 9) to the author of the first "Religio Medici" there are two points on which I would like to comment.

Firstly, Dr. Guthrie states that the book was translated into several languages including Italian. It is true that in a letter to the antiquary, John Aubrey, dated 14 March, 1672–3, Sir Thomas Browne stated that he "writt *Religio Medici* in English, which was since translated into Latin, French, Italian, High and Low Dutch." But up to the present time no contemporary edition in Italian has ever been seen, and it seems that Browne was himself under a misapprehension about this. The statement did not, in fact, become true until the appearance of Professor Piccoli's translation in 1931.

Secondly, Dr. Guthrie states that "of the closing years of Browne's life we have little information." This appears to me to be the very opposite of the truth. The later years of Browne's life are much more fully documented than any other period by the voluminous and interesting correspondence which has survived. Most of the letters are addressed to his son, Dr. Edward Browne, FRS, and they provide a detailed picture of Browne pursuing his medical practice and scientific interests in Norwich.

London, N.W.3. GEOFFREY KEYNES.

THE SIZE OF INFLUENZA A VIRUS

SIR,—In the kindly notice of my Pelican book *Beyond the Microscope*, in your issue of Oct. 2, you stigmatise as "rash" my acceptance as "an established fact" of the American estimate of 15 mμ as the diameter of the influenza virus particle, against the English estimate of 100 mμ. May I, as briefly as possible, attempt to justify my apparent rashness?

The two most recent American papers on the size of the influenza virus particle are those by Chambers and Henle (*J. exp. Med.* 1943, 77, 251) and Chambers, Henle, Lauffer and Anderson (*Ibid*, p. 265) and I quote freely from them. It would, I think, be agreed that the presence of cell components in a virus preparation casts doubt on all measurements of virus particle size unless the possibility of adsorption of virus on the larger particles is eliminated. Now the English work on the size of influenza virus was carried out on mouse-lung tissue and the American work on mouse-lung tissue and the extra-embryonic fluids of chicks. The following are the relevant facts:

1. Both infected and normal mouse lung tissue contain particles of 100 mμ.

2. The infectious unit from tissue suspensions is about 100 mμ in diameter and is of the same chemical composition as particles of the same size and abundance separated from normal tissue by an identical procedure.

3. Particles 100 mμ in diameter separated from normal lung tissue can adsorb the virus completely from the egg fluid and thereby acquire the infective property. Moreover the antigenic properties of the particles from infected lung extracts are similar to those of the normal lung particles and differ only in the superimposition of the antigenic structure of the virus as it occurs in chick allantoic fluid.

4. Extra-embryonic fluid of chicks infected with the virus of influenza A contained the virus in high concentration, but the virus frequently could not be sedimented from such fluid by speeds which would remove all virus activity from mouse-lung filtrates. These authors spun a mixture of tobacco-mosaic virus and influenza virus from allantoic fluid and found that while the tobacco-mosaic virus was almost completely sedimented under their conditions, about half the influenza virus actively remained in the supernatant. Tobacco-mosaic virus sediments with about the same velocity as a spherical particle of 50 mμ of the same density as most viruses.

5. Ultrasonic vibrations increased the infectivity of lung-tissue sediments by 10–30 fold, thus suggesting that aggregates were being broken up by this means.

6. The infectivity of some of Chambers and Henle's preparations was such that if the infective units were 100 mμ in diameter, infection could be obtained with considerably less than one particle.

7. Electron micrographs of the isolated virus protein indicate that the predominating unit is roughly spherical in shape and has a particle diameter of about 11 mμ.

It seems to me that this evidence is at least as good as much of that which supports the estimates of other virus sizes accepted as established facts.

Plant Virus Research Station, Cambridge. KENNETH M. SMITH.

TREATMENT OF BURNS AT FIRST-AID POSTS

SIR,—Would it not be wise to insist on the masking of all dressers who treat burns at first-aid posts? In your issue of May 29 Leonard Colebrook describes a case from whose burn hæmolytic streptococci were cultivated four hours after it was sustained. Masking of all attendants on this case might well have prevented the infection and resultant delay in healing. Recently I had the chance of hearing of a community of 120 who had nose and throat swabs taken. No less than 70 of these were carriers; all were feeling healthy and carrying out their routine duties. A burn case attended by one of these 70 would probably have been infected. The masking of all nurses attending confinements is no longer an innovation. It is a routine standard to ensure a satisfactory puerperium. No-one need suggest the old bogy of frightening the patient; it just does not exist. In my opinion all first-aiders and all dressers and nurses in the hospital casualty departments should automatically mask before attending to burns.

Smethwick. C. KIRBY.

CHILLED KAOLIN POULTICE

SIR,—From time to time methods of treatment are described which involve the local application of low temperatures.[1] I would suggest that some attention should be paid to the value of the local application of *chilled* kaolin poultices, as this preparation will maintain a low temperature over a long period in the same way that it will maintain a high temperature. The details of the method are as follows:

Kaolin poultice is spread on lint to an even thickness of a quarter of an inch. The exposed surface is covered with a layer of gauze to obviate sticking. Three such "cold poultices" are prepared and cut to shape. They are packed in large envelopes or flat X-ray film tins and are chilled in a domestic refrigerator. The poultices are applied one at a time, and are held in place by bandage over a thick layer of cotton-wool. Each is left on until it no longer feels cold; it is then replaced by a newly chilled one and the discarded one is repacked in its tin or envelope and returned to the refrigerator for re-chilling.

This method is described with some diffidence as its use is limited to certain definite indications. But I have used "cold kaolin" since 1938 and am convinced of its value as a simple and easily available means of obtaining a local application of low temperature over a long period.

W. S. PARKER.

1. Ungley, C. C. *Lancet*, 1943, i, 681; Allen, F. M. *Ibid*, p. 723.

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Obituary

ANGUS MACDONALD

MB EDIN; LIEUT-COLONEL RAMC

Colonel Angus Macdonald was killed in Tunisia in May by a shell-burst as he drew up in his car outside one of his advanced dressing-stations.

He was educated at Merchiston Castle School, and following in the footsteps of his father and grandfather he qualified in medicine at the University of Edinburgh in 1930. After holding a resident appointment at Guildford Hospital he joined the RAMC the next year and was posted to India. He served at Lahore for a little over a year as staff surgeon and medical officer to the NW Railway, and in 1933 he was sent to Burma, returning to this country at the end of his foreign tour in 1936. For a time he was medical officer to the garrison at Loch Swilly, then occupied by the British, but in 1937 he came to London to attend the senior officers' course at Millbank, was selected to specialise in pathology, and in due course appointed DADP to the Northern Command. After a few months he was sent to Cambridge where he studied physiology and the pathology of chemical warfare under Sir Joseph Barcroft, before joining the staff of the Gas Establishment. On the outbreak of war Macdonald went to France and was attached to GHQ, but early in 1941 he transferred to a field ambulance and was soon promoted to the command of one. The following year he was sent to the Middle East and after serving in various places arrived with his ambulance in Tunisia during the final battle of the campaign. A colleague who had served with him in different parts of the world writes:

Vandyk

Angus Macdonald was popular wherever he went, for he loved humanity, and had great personal charm. He was a sound doctor, well-informed, practical, and conscientious, but it was the command of a medical unit on active service which gave him his opportunity. His happy, understanding disposition enabled him to maintain his unit at the highest pitch of efficiency, yet contrive to make the lot of everyone who served under him as pleasant as circumstances allowed. His type is only too rare, and he can ill be spared.

While he was in Burma Colonel Macdonald married Miss Dorothy Goodban and he leaves her with two sons.

CHARLES RYAN

MB DUBL; MAJOR RAMC

Major Charles Ryan, who was reported missing, believed killed, at sea during September, was the youngest son of the late Dr. J. F. Ryan. He was educated in Ireland and qualified from Trinity College, Dublin, in 1931. The following year, on his father's death, he took over part of the family practice at Loughrea in co. Galway. Three years later he joined the RAMC with a short-service commission and served in Egypt, Palestine, Singapore and Shanghai. He returned to England at the beginning of 1940 and since then had been posted to hospital carriers. In 1939 he married Miss Susan Battock, and they had one son.

Vandyk

WEST INDIAN NURSES FOR THE LCC.—The London County Council have offered to accept annually 18 candidates from the West Indies for general nursing training in LCC hospitals. The candidates must have achieved an agreed standard in education and medical fitness, and will undertake a six months' preliminary course in a West Indian hospital to test their fitness for nursing. The plan will be reviewed at the end of twelve months.

Notes and News

THE VOICE OF THE ORACLE

Prof. MAJOR GREENWOOD, in his Linacre lecture, set out the virtues and vices of authority, especially in the field of medicine, and his study has now been published.[1] Unlike at least one of his predecessors he does not condemn Linacre as a slave to the authority of Galen, but considers that as a practical teacher he preferred—as in fact all teachers must do—to base his teaching on an authority at the time not merely recognised but alone in the sphere of medicine. The experiments on which many scientific facts accepted by the civilised world are based are not generally known: they are accepted on the word of authority. The average doctor could not prove by experiment that the cardiac rhythm is controlled by nervous impulses; he accepts the proposition because authorities inform him that there is convincing evidence of its truth. Authority therefore has an undoubted value in education. It is only when authority seeks to establish an absolute despotism that men revolt and revile it. Shakespeare knew all about that aspect of the controversy.

> And art made tongue-tied by authority,
> And folly (doctor-like) controlling skill,
> And simple truth miscalled simplicity,
> And captive good attending captain ill. . . .

When this occurs men who delight to use their brains kick against the trammels of authority and push their enmity and abuse so far as to deny it any virtues whatsoever. Professor Greenwood explores some of the aspects of this ancient dispute and in doing so incidentally pays high tribute to the late Walter Fletcher who exercised a wise and beneficent authority on medical research in this country. The lecture is not always easy reading, and those who were fortunate enough to hear its delivery will be glad to revive their recollection of some of the argument.

TAKING LESS PAINS WITH OUR SUMS

THE reader of Mr. Sawyer's book [2] will not emerge from its pages an accomplished mathematician—that would be asking too much for ninepence—but he will certainly have had more than ninepennyworth of delight. The author's main object has been to dispel the fear of mathematics, whose difficulties to so many of us lie, he believes, in its presentation as something quite apart from everyday life. An endless procession of meaningless signs, words and rules which fails to arouse the imagination can lead nowhere; mathematical reasoning must grow gradually and naturally through practical work with real objects. Mr. Sawyer therefore sets out to show how mathematicians *think* by putting their methods in relation to simple problems of everyday life. A clear and persuasive style, coupled with the endless patience necessary to be sure that it is clear, takes him quite a long way, even if all the fears and difficulties cannot be banished. Textbooks are written, he says, for people who already possess a strong desire to study mathematics; they are not written to create such a desire. In the younger generation his own book should actively help to create it. The older will at least read much of it with pleasure and think wistfully of what they might have done if only they had had a Mr. Sawyer as a teacher.

AN AMERICAN NURSING ACT

CONGRESS, by passing a special act, has established the United States Cadet Nurse Corps. The act arranges for grants-in-aid to be made to nursing schools, which will relieve the student nurse from the tuition fees and personal expenses which she normally has herself to meet in America. Schools taking part in the programme will go on selecting their own students and planning their curriculums, but must fulfil certain broad requirements in regard to minimum standards of nursing education, and speeding up of the curriculum. Cadet nurses must undertake to continue in military or essential civilian nursing for the duration of the war. They will receive full tuition, uniform, and a small regular monthly stipend, so that no girl will be deterred by financial considerations from undertaking nursing. It is hoped that the act will help to provide the 65,000 student nurses now needed in American schools.

1. Authority in Medicine: Old and New. Major Greenwood, D SC, FRCP, FRS (Cambridge University Press. Pp. 32. 1s. 6d.)
2. Mathematicians Delight. W. W. Sawyer, assistant lecturer in mathematics, Manchester University. Penguin Books. Pp. 200. 9d.

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Royal College of Surgeons of England

At a meeting of the council of the college Sir Alfred Webb-Johnson, the president, read Mr. W. H. Collins's letter (see p. 520) announcing his gift of £100,000 for the endowment of the department of pathology and the institution of a chair of human and comparative pathology. The council decided to reopen the Bernhard Baron research laboratories as soon as they can be reconditioned.

The Blane medal was awarded to Surgeon-Commander D. P. Gurd, RN, for his investigation into the incidence of trachoma in the Maltese Islands. Dr. F. K. Sanders was reappointed a Leverhulme scholar for a second year. The following appointments have been made by the Mackenzie-Mackinnon research fund committee of the Royal Colleges of Physicians and Surgeons:

Mr. G. H. Bourne, D SC. (Oxford) (reappointed). On the comparative histology of the mammalian adrenal gland; and the rôle of vitamin C in the regeneration of bone, with special reference to the acceleration of the healing of fractures.

Miss Jean Dollar, MS (Royal Eye Hospital). An investigation into the value of cockerel serum in ophthalmic surgery, with especial reference to its use in connexion with mucosal and corneal grafts.

Miss Shirley Draycott (Royal College of Surgeons). The effect of the administration of sulphydryl amino-acids on the antisyphilitic action of arsphenamides.

A diploma of fellowship was granted to F. H. Masina (Camb. and St. Bart's) and diplomas of membership to C. O. Fung-Kee-Fung, R. N. G. Holloway, L. Howell, P. H. Huggill, J. A. Loveless, R. G. May, A. D. Payne, M. I. Pott, N. H. Seaton and B. A. Ward. Diplomas in child health were granted jointly with the Royal College of Physicians to the following:

Patience E. Barclay, Monica M. Bird, J. P. Bound, Annie E. Burns, Cecil M. Drillien, Margaret Egan, H. V. L. Finlay, Cecilia Henry, Leo Hornung, Margaret M. P. Jolly, F. L. King Lewis, F. G. Leslie, Kathleen B. McClintock, Rosaleen De C. McCormick, Mary H. M. Snape, Cecilia V. Urquhart, Fanny D. Wride, and H. J. Young.

Mr. H. S. Souttar will deliver the Bradshaw lecture on Thursday, Nov. 11, at 3.15 PM. He will speak on physics and the surgeon.

Medical Honours

The following awards have been made to RAMC officers for gallant and distinguished service in the Middle East:

CBE (military division).—Brigadier W. D. D. Small, MD EDIN.

DSO.—Lieut.-Colonel L. T. Furnivall, MRCS, and Lieut.-Colonel R. McI. Gordon, DFC, MB GLASG.

OBE (military division).—Lieut.-Colonel D. M. Blair, MB EDIN., Lieut.-Colonel R. H. Bland, MD DUBL., Lieut.-Colonel Ernest Bulmer, MD EDIN., Major A. L. Chute, RCAMC (attached RAMC), Lieut.-Colonel J. B. S. Guy, MB DURH., Lieut.-Colonel T. D. Phelan, MB NUI.

MBE (military division).—Captain H. C. Allan, MB EDIN., Captain K. G.-A. Barlow, MB SHEFF., Major A. K. Borland, MRCS, Major D. MacL. Douglas, FRCS, Major M. H. Evans, BM OXFD, Captain A. M. Lester, MB CAMB., Major P. J. May, MB NUI, Captain G. B. Northcroft, MRCS, Captain K. R. D. Porter, MRCS, and the late Captain A. F. Smith, BM OXFD.

MC.—Captain R. G. MacLeod, MB GLASG., Captain A. D. Parsons, MB LOND., Captain M. J. Pleydell, MB LOND., Captain J. W. Taylor, MB, and Captain C. W. Warner, MB LPOOL.

Eugenics Society

On Tuesday, Oct. 26, at 5.30 PM Dr. A. Spencer Paterson will address the society on the size of the family of the business, professional and titled classes. Lord Horder is to be in the chair and the meeting is to be held at the rooms of the Royal Society, Burlington House, Piccadilly, London, W.1.

Leicester Christian Medical Association

At a meeting of medical practitioners held in Leicester it was decided to form this association, under the chairmanship of Dr. J. V. C. Braithwaite, with the object of "promoting the profession and practice of Christianity among the medical men and women resident in the city of Leicester and counties of Leicestershire and Rutland." Any medical man or woman in the area who accepts the Christian Faith is eligible for membership and forty have already joined. The Bishop of Leicester, the Very Rev. Father Prior, and the president of the Free Church Council have become honorary members, and two associate members from each of the three denominations have been appointed from among the clergy. Further particulars may be had from Dr. E. K. Macdonald, the hon. secretary, 24, Halford Street, Leicester.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

British Orthopædic Association

The annual meeting of the association will be held at 1, Wimpole Street, London, W.1, on Friday and Saturday, Oct. 29 and 30. At 9.15 AM on Friday short papers will be read on lesions of articular cartilage of the patella, fractures involving the knee-joint, and injuries of the astragalus. Mr. G. R. Girdlestone will give his presidential address. At 2 PM Mr. G. Gomme of the Ministry of Labour, Mr. William Gissane and Colonel R. L. Diveley, USAMC, will discuss various aspects of rehabilitation, and cine films will be shown. At 10.15 AM on Saturday there will be papers on gunshot wounds of the elbow-joint, surgery in Russia, and poliomyelitis in Malta.

Infectious Disease in England and Wales

WEEK ENDED OCT. 9

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 3249; whooping-cough, 1481; diphtheria, 732; paratyphoid, 8; typhoid, 9; measles (excluding rubella), 581; pneumonia (primary or influenzal), 557; puerperal pyrexia, 159; cerebrospinal fever, 30; poliomyelitis, 15; polio-encephalitis, 1; encephalitis lethargica, 1; dysentery, 263; ophthalmia neonatorum, 70. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Oct. 6 was 1977. During the previous week the following cases were admitted: scarlet fever, 262; diphtheria, 39; measles, 14; whooping-cough, 35.

Deaths.—In 126 great towns there were no deaths from measles or enteric fever, 1 (0) from scarlet fever, 11 (2) from whooping-cough, 9 (1) from diphtheria, 46 (6) from diarrhœa and enteritis under two years, and 14 (1) from influenza. The figures in parentheses are those for London itself.

Birmingham and West Bromwich each reported 5 fatal cases of diarrhœa.

The number of stillbirths notified during the week was 190 (corresponding to a rate of 29 per thousand total births), including 27 in London.

Appointments

The following examining factory surgeons have been appointed:
EWING, J., for Whitchurch, Hants;
OWEN, C. G., MRCS, for Stone, Staffs;
WOODLAND, F. A. J., MRCS, for Gunnislake, Cornwall;
BENSON, G. E. M., BM, surgeon lieut.-commander RNVR;
LANNY, JOHN, LRCPE, surgeon lieutenant RNVR;
RUSSELL, RONALD, MB DURH., surgeon commander RN.

Births, Marriages and Deaths

BIRTHS

FITZGERALD O'CONNOR.—On Oct. 12, the wife of Captain G. Fitzgerald O'Connor, RAMC, of Hednesford, Staffs—a son.

HAMILTON PATERSON.—On Oct. 8, at Oxford, to Dr. Ursula Hamilton Paterson (*née* im Thurn), the wife of Captain J. Hamilton Paterson, RAMC—a daughter.

KEIGHLEY.—On Oct. 12, at Dewsbury, Yorks, the wife of Major Robert Keighley, RAMC—a son.

LEISHMAN.—On Oct. 12, the wife of Dr. Hugh Leishman, of Alresford, Hants—a daughter.

MATTHEW.—On Oct. 10, the wife of Dr. P. C. Matthew, St. Ives Cornwall—a son.

MARRIAGES

MACKAY—HARGER.—On Oct. 10, Gordon Cameron MacKay, MB, RAMC, of Pontllanfraith, Mon., to Beryl Arden Harger, of Bournemouth.

MACLURE—MACFARLANE.—On Oct. 12, at Glasgow, William Alastair Maclure, surgeon lieutenant RNVR, to Agnes Macfarlane, of Lincoln.

NEWMAN—BASSET.—On Oct. 7, at Foxearth, Philip Harker Newman, DSO, MC, major RAMC, to Elizabeth Ann Basset, QAIMNSR.

TIBBS—O'MEARA.—On Oct. 9, in London, David John Tibbs, lieutenant RAMC, to Patricia Joan O'Meara.

DEATHS

ADDERLEY.—On Sept. 27, at Ladysmith, South Africa, Arthur Charles Adderley, DSO, LRCPE, lieut.-colonel RAMC retd., aged 70.

HAMMOND.—On Oct. 11, at Salisbury, Charles Francis Dyer Hammond, MB GLASG., aged 61.

POWELL.—On Oct. 7, at Bristol, John Joseph Powell, MD LOND.

ROBERTSON.—On Oct. 6, at St. Mary Cray, Kent, Hugo Given Robertson, OBE, MB GLASG., lieut.-colonel RAMC retd., aged 59.

ROWNTREE.—On Oct. 14, at East Grinstead, Cecil Rowntree, MB LOND., FRCS.

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THE PHYSICIAN IN WAR
IN HARVEY'S TIME AND AFTER[1]

W. E. HUME, CMG, MD CAMB, FRCP
EMERITUS PROFESSOR OF MEDICINE, UNIVERSITY OF DURHAM; PHYSICIAN, GENERAL HOSPITAL, NEWCASTLE-ON-TYNE; HON. COLONEL RAMC TA (50TH DIV.)

BORN in the reign of Elizabeth, in 1578, 10 years old at the time of the Spanish Armada, Harvey was a spectator of English history until within 15 months of the death of Oliver Cromwell (Sept. 3, 1658). As physician to Charles I—appointed in 1630—he was brought face to face with war, and we know that he was present at the battle of Edgehill. There is no record that he attended the wounded on any field of battle, but he was interested in the case of Adrian Scrope who received 19 wounds at Edgehill, recovered, and lived 13 more years. Both in his journeys to the North and during any battle at which he was present Charles I had physicians attached to him and his Court, of whom Harvey was one. This militant period of Harvey's life seems a fitting reason for commemorating today the work of physicians in war in Harvey's time and after it, when so many of our College are engrossed in duties in the various Services at home and abroad.

Before the outbreak of the Civil War the vacillating King went to Scotland on four occasions (1633, 1639, 1641 and 1646) and it is certain that Harvey accompanied him on the first three (Terry) Thus in 1633 Harvey applied for leave of absence from St. Bartholomew's Hospital to accompany the King when he was crowned at Holyrood on June 18, 1633. After an interval of 6 years Harvey again accompanied Charles when he went north to mobilise his forces against the Scots. In February, 1639, a Scottish army under Alexander Leslie was massing on the border near Berwick and towards the end of April Charles reached Durham. We can presume that Harvey attended divine worship with the royal party in Durham Cathedral on Sunday, May 5, 1639, when Bishop Morton preached from the appropriate text: "Let every soul be subject to the higher powers." Charles remained in Newcastle till May 23, collecting and reviewing his motley troops, and reached Berwick on May 24, 1639. The "Pacification of Berwick" was completed on June 24, 1639, without a shot being fired; as one critic contemptuously expressed it "I never heard so much as one louse killed by either Army." Mr. William Angus sends me from HM General Register House, Edinburgh, a copy of an entry in the printed calendar of State papers, Domestic, 1639 which runs as follows:

"1639, July 10th Berwick. Richard Jannsey to Richard Harvey. My master commanded me to send two of his trunks with Lord Newport's goods by reason of his longer stay here, I fetched them from thence, and have sent them by sea with the Lord General's goods. . . .

P.S.—Dr. Beten (Bethune) is buried this day, and Dr. Harvey is in his place, and Dr. Johnson has Harvey's place."

The King was accompanied by more than one physician and Dr. Bethune had been senior to Harvey.

The Short Parliament was dissolved in May, 1640, and this was followed by the Scottish invasion of Northumberland. On Aug. 28, 1640, the battle of Newburn was fought, the English were defeated and the Scots invaded Northumberland and Durham. It has been hinted (Power 1897, Willis 1878a) that Harvey may have been present at the battle of Newburn but this is extremely unlikely since Charles himself was in York at that moment.

The next year Harvey went north for the third time. In August, 1641, Charles made terms with the Scots and on Aug. 13, 1641, he reached Newcastle on his way to Edinburgh to obtain Scottish support against the English Parliament. There seems no doubt that Harvey was with him on this occasion, because during the stay of the Royal party in Edinburgh Harvey visited and received the freedom of Aberdeen on Aug. 30, 1641.

IN CIVIL WAR

In November, 1641, Parliament under Pym's guidance proceeded to formulate the Grand Remonstrance, and the Civil War began on Aug. 22, 1642, when Charles raised his standard at Nottingham. From now onwards the details of Harvey's career are better known and the circumstances surrounding his presence at the indecisive battle of Edgehill on Oct. 23, 1642, have been often referred to.

Harvey was now 64 years old and was probably relieved and happy to settle in Oxford, when Charles and his troops fell back to that city after the battle of Edgehill. His attendance on the Queen, his daily observations on the growth of the chick with Dr. Bathurst, and his Wardenship of Merton College are well known. After leaving Oxford he returned to London as the guest of one or other of his brothers. When Dr. Ent visited him at Christmas in 1650 to obtain permission to publish his papers on generation, and asking him if all were well with him, Harvey replied:

"How can that be when the State is so agitated by storms, and I myself am yet in the open sea? . . . And indeed," he added, "were not my mind solaced by my studies, and the recollection of the observations I have formerly made, there is nothing which should make me desirous of a longer continuance. But thus employed, this obscure life and vacation from public cares, which disquiet other minds, is the medicine of mine."

At this moment we too find ourselves "in the open sea."

Though Harvey himself played little active part in the care of the sick and wounded he must have been aware of any plans for their reception and treatment. These were matters which Charles must have discussed with Harvey as we know that the King took an humane interest in the disposal and treatment of the wounded on both sides. We would have expected also that Harvey must have observed facts of interest to him connected with bleeding in wounds.

Up to the 18th century the physician's rôle in war, as in the case of Harvey, was confined to his duties as personal physician to Royalty or to a commander in the field. It has been truly stated that "the 17th century was an age of extraordinary activity in science, art and literature; while the practice of medicine, hospital management and organised care of the sick and wounded sank to a very low level" (Garrison 1922). During Elizabethan and early Stuart times the unit of military organisation was the company, and the captain of the company was expected to provide his own surgeon and the necessary equipment—though the captains often failed in their duty or appointed very unsuitable surgeons.

In the Civil War (1642–51) there was a great shortage of army doctors on both sides. At the outbreak the Royalist party obtained the services of medical officers more easily than the Roundheads, but as the war proceeded the Parliamentarians, controlling the government and the treasury, were better served. On both sides much of the medical care of the sick and wounded devolved on the local practitioners (Firth 1902).

The military surgeons were treated as non-combatants and wore a distinguishing badge. "Surgeons," says an Elizabethan author, "must wear their baldric, whereby they may be known in time of slaughter: it is their charter in the field." After a battle the collection and treatment of the wounded was haphazard and casual. A victorious general ordered or allowed the people of the countryside to carry away the wounded left behind by the conquered. Officers were borne away to neighbouring country houses where the lady of the house might have some skill in the dressing of wounds. Mrs. Hutchinson, wife of the Parliamentary governor of Nottingham, bound up the wounds of Royalist prisoners as well as Parliamentarians, doing "what she thought was her duty to them, as fellow creatures, not as enemies," even though Captain Palmer, a Parliamentarian, came in and told her "his soul abhorred to see this favour to the enemies of God" (Hutchinson 1846).

In 1645 Parliament reorganised its forces and each army had a physician-general, a surgeon-general and an apothecary-general.

After the Civil War (1651) there were consecutive appointments as physician-general to the army, whose chief duty was to select physicians for service in the army; and in war-time he was often made personal physician to the commander-in-chief in the field. On

1. Extracts from the Harveian Oration delivered before the Royal College of Physicians of London on Oct. 18, 1943.

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the field of battle it is probable that the organisation for the care of the sick and wounded was in the hands of the surgeon-general and that the work of the physician-general was limited to the hospital.

PIONEERS OF MILITARY MEDICINE

At the beginning of the 18th century England was allied with Holland against the French in the war of the Spanish Succession (1701–13). The English forces numbered about 40,000: poverty and impressment were the chief recruiting agents. In the great battles of that period (Blenheim 1704, Ramillies 1706, Oudenarde 1708, Malplaquet 1709) Marlborough's personal care of the sick and wounded stands out more prominently than the individual work of any particular physician. Before the action of Blenheim (1704) "he took pains to have the surgeons shown the exact places of assemblage and care of the wounded," and after the victory he wrote to Godolphin "I have been so employed about our own wounded men and prisoners that I had not had one hour's quiet" (Garrison 1922).

The real pioneers of English military medicine arose in the war of the Austrian Succession (1740–48) in the persons of Pringle, Brocklesby, Donald Munro and George Cleghorn, of whom the most outstanding figure was Sir John Pringle (Munk 1878b).

Taking his doctor's degree in Leyden in 1730 and after a period of study in Paris, Pringle was made professor of pneumatics and moral philosophy at Edinburgh University (1734). The Earl of Stair, appointed to command the British troops in Flanders, took Pringle with him as his private physician and made him physician to the military hospital there. Pringle was at the battle of Dettingen on July 27, 1743, and is given the credit of suggesting to the Earl that hospitals should be respected and protected by the opposing forces. The Earl wrote to the Duc de Noailles requesting his acquiescence in this suggestion. The Duc readily agreed and immediately gave practical effect to his promise by going out of his way to avoid disturbance or damage to the British hospital stationed at Feckenheim. This episode has recently been referred to by Lord Amulree (1943).

When the Earl of Stair returned to England the Duke of Cumberland persuaded Pringle to remain in Flanders and made him physician-general to the forces and physician to the royal hospitals. Pringle returned to England when the Duke was recalled to lead the forces against the Jacobites in 1745, and he remained with that Army to the battle of Culloden (April 16, 1746). He then returned to the continent and remained in Dutch Brabant until the treaty of Aix la Chapelle (1748) brought hostilities to an end.

Settling in London practice in 1749 he became physician to the Duke of Cumberland and remained in the Army as a director of, and physician to, Chelsea Hospital. In 1750 he published his *Observations on the nature and cure of hospital and jayl fevers* in which he showed that the common fever was typhus and that it was the same in both hospital and gaol.

In 1752 he published *Observations on the Diseases of the Army* (Pringle 1812) which established his claim to be the father of modern military hygiene and medicine. In the preface he makes this remark:

> "This branch of medicine, which ought long ago to have been complete, seemed to be still in a manner new: so little is a military life consistent with that state of tranquillity requisite for study and observation."

In this work he gave his medical experiences of the campaigns in Flanders (1742–45), in Great Britain (1745–46) and in Dutch Brabant (1746–47–48). He had studied the atmospheric and seasonal conditions in each locality. He demonstrated the better health of troops situated in camps on high ground as opposed to low marshy ground, and that the upper stories of houses were more healthy than the lower. He attributed much of the ill health of soldiers and the causes of disease to such factors as foul air from marshes, decaying vegetable matter and soiling of the ground with animal excreta. He preached against overcrowding in barracks, hospitals, gaols, and ships and showed by statistics the importance of air space. Under suitable conditions he advocated the ventilating system invented by the Rev. Stephen Hales, the ingenious rector of Teddington, with whose experiments on arterial and venous pressure we are more familiar. Pringle thought that all men should contribute to, or be compelled to feed in a mess, in order to ensure sufficient and suitable food, as the soldier was apt to spend on drink in one day what ought to keep him in food for one week. He was the first to make a serious attempt to discriminate between the various fevers, though he thought one type of fever might develop into another. He recommended improvements in bedding, clothes, blankets, shoes and advocated plenty of warmth and fuel. He advised recreations and diversions for the soldier in training. He pointed out that dysentery and fevers often appear together in the same season.

Pringle became a licentiate of the college in 1758 and was elected a Fellow in 1763: nominated Censor in 1770 he declined to act and paid the statutory fine. In the Royal Society he played a distinguished part: elected a Fellow in 1745, he was awarded the Copley medal for his experiments on septic and aseptic substances, an account of which is included in his *Observations on the diseases of the Army*. In 1772 he was elected President (1772–78) and was in the habit of discoursing on the subjects for which the Copley medal was annually awarded, "displaying a breadth of knowledge and depth of learning which greatly impressed his contemporaries." He was an intimate friend of Captain Cook and it must have given Pringle immense satisfaction to award the Copley medal to the explorer (in absentia) for his account of the means by which he kept his crews free from scurvy. He died of an apoplexy in 1782, aged 75 years.

During the same period of the 18th century medical reformers arose in the Navy. The accounts of Anson's and other voyages of that time leave little doubt that Smollett's gruesome description of life at sea in *Roderick Random* was no exaggeration. "I was much less surprised that people should die on board, than that any sick person should recover." Fortunately there appeared in the Navy three physicians who did much to improve the unhappy lot of the seamen—Lind, Blane and Trotter. Thomas Trotter said "the Army of the country could boast of a Pringle, Cleghorn, Munro and some others who have written since the last war, but the name of Lind stands alone in the Navy."

THE FATHER OF THE RAMC

Between 1793 and the battle of Waterloo (1815) England sent expeditionary forces to meet Napoleon on the continent and in Egypt. The military life of Sir James McGrigor (1861) began at this eventful period. His autobiography covers his life from the time of his joining the Army in 1793 up to his appointment as director-general in 1815—twenty-two years. For eleven years he was the medical officer to the 88th Regiment which became the Connaught Rangers, and saw service with them in Jersey, Holland, the West Indies, India and Egypt. He was continually fighting typhus fever and from his earliest service the sick quarters under his charge were always cleanly, when often the living quarters of the regiment were filthy. He kept notes of all his cases during the five months' voyage to India and presented to the Bombay Medical Society in 1801 *A memoir on the health of the 88th and other regiments from June 1800 to May 1801.* When peace was signed McGrigor returned to England and was transferred to the Royal Horse Guards at Windsor. There he found a small cramped military hospital, rampant with typhus and hospital gangrene. He obtained a larger and more roomy building and "by moving the men from one ward to another, changing the atmosphere and destroying all the sponges used in dressing, together with other precautions he finally got rid of the disease."

In 1805 he was made a deputy inspector-general of hospitals, and served in the Northern Command before being appointed by the Duke of Cumberland to the more important South-Western Command. He made full use of his powers of organisation in both Commands, inspiring all the officers under his charge with his clinical zeal; with their willing coöperation he collected valuable statistics. He was sent to Walcheren in 1809 where the British camping grounds were under water and three thousand men were sick with malaria. He commandeered from an American vessel a supply of "the bark" which was lamentably short.

Towards the end of 1811 he was appointed chief of the medical staff under Lord Wellington in the Peninsula and he arrived in Lisbon on Jan. 10, 1812. He was

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engaged in all the battles and sieges from Ciudad Rodrigo to Toulouse. He soon gained the confidence of Lord Wellington and was ordered to wait on him daily after breakfast, together with the adjutant-general, the quartermaster-general, and the commissary-general, to present a report on the number of sick and wounded with all the details of their disposal, When the Army eventually advanced against Vittoria the efficiency of the medical services had provided Wellington with some 4000–5000 men whom he thought would have been lost to him from ill health—and a distinguished person said "that he thought the extraordinary exertions of the medical officers of the Army might be said to have decided the day at Vittoria."

When Wellington was writing his despatch to the Earl of Liverpool after the capture of Badajoz, McGrigor entered the room with his report and finding the Commander-in-Chief in excellent spirits requested that the work of the medical officers should be noticed. Though Wellington had completed his despatch he made this addition:—

Camp at Badajoz, 8th April, 1812.

MY LORD,—It gives me great pleasure to inform your Lordship that our numerous wounded officers and soldiers are doing well.

I have had great reason to be satisfied with the attention paid to them by Mr. McGrigor, the Inspector-General of Hospitals, and the medical gentlemen under his direction and I trust that the loss to the service upon this occasion, will not eventually be great.

I have the honour to be, &c.,

WELLINGTON.

This was the first time that the work of medical officers had been mentioned in a despatch and publicly acknowledged. The example was followed later by the Navy.

The downfall of Napoleon enabled McGrigor to visit Paris and other towns to inspect the French system of dealing with their sick and wounded, but the only features which impressed him were the ambulances. After the peace he retired with a pension of £3 a day and a knighthood, but he was recalled to the Army as director-general, and settled down to elaborate plans for the improvement of the Army medical service.

By his frequent contact and correspondence with medical officers of all ranks he brought about a new spirit of interest and keenness on their work. He was mindful of the hardships of soldiers' widows and children, and in 1816 founded the Army Medical Friendly Society which provided annuities for widows of fallen officers, an insurance agency whose capital had grown to £80,000 when he retired in 1851. He also founded, in 1820, the Medical Benevolent Society and had collected £15,000 at the date of his retirement.

He died in London in 1858, aged 87. A humane man and a great administrator, McGrigor is rightly regarded as the father of the RAMC. Wellington said of him "He is one of the most industrious and successful public servants I have ever met with."

PRELUDE TO MODERN WAR

"The Crimean War . . . taught us the futility of trying to conduct a war at a distance from home with inefficient personnel and at the same time attempting to control and hamper the conduct of medical officers in the battle area by orders from the central government, who could only have an academic knowledge of the conditions in the actual theatre of war" (Garrison 1922b).

The British entered the war, with only 40 ambulance wagons, a pack mule and 10 litters for each regiment, no winter clothing, no shelter tents and a worthless corps of male nurses commandeered from the line." The suffering troops were eventually housed in wooden huts with adequate creature comforts, and Florence Nightingale went out with a corps of trained nurses. By these means the mortality of the British went down, though that of the French went up since they were still under canvas during the severe winter of 1855–56. The losses per thousand from disease were the highest in history; the diseases being cholera, typhus, dysentery and scurvy.

In the South African War (1899–1902) the losses by sickness far exceeded those caused by shot and shell. About half a million men were employed, with an average strength of approximately 200,000, and the annual ratio of admissions to hospital per 1000 troops was 34 for wounds and 843 for sickness. There were 59,750 cases of enteric fever, with 8227 deaths. Antityphoid inoculation based on the work of Sir Almroth Wright was still in the experimental stage and was only employed on a restricted scale. In the garrison of Ladysmith 1705 were inoculated and 10,529 were uninoculated (A. E. Wright, *Lancet*, 1902, ii, 651).

A NEW ORDER

The war of 1914–18 saw clinical physicians for the first time in war employed as medical specialists in hospitals and in a consulting capacity in armies and in the fleet. The medical organisation of the army in France as it had developed in 1918, based on a sessile type of warfare, gave opportunities for steady clinical work and investigation almost comparable to the conditions of medical practice met with at home in times of peace. Both physicians and surgeons were greatly helped in their work by the mobile laboratories, and a hospital which had attached to it an efficient radiological department and a mobile laboratory was able to do clinical work of a high order. The Medical Research Council established an active link between the work done in France and England. So we had physicians, surgeons, sanitarians, bacteriologists and radiologists working together as teams and not as individuals. Today we commemorate the work rather than the names of those who advanced the knowledge of medicine in the last war and made the lot of the sick soldier incomparably better than had been possible in any previous war. If no names are mentioned, no-one can be forgotten. In a brief review of some of the lessons of the last war it will be apparent that recent advances in medical knowledge have already solved some of the problems of that day, and the solution of many has been accomplished by the brilliant discoveries in chemotherapy.

The standard of medical work depends upon the state of medical knowledge of the day, and in the interval of 14 years between the South African and the 1914 war no branch of medicine had developed so rapidly as bacteriology. The application of this recently acquired knowledge enabled physicians to attack infections with a hope of success denied to previous generations. At the outbreak of the last war prophylactic measures were taken against smallpox and typhoid fever. In spite of vaccination against infection by the *B. typhosus* there were many cases of clinical enteric fever in France in 1914 and 1915, early proved to be infections by *B. paratyphosus A* and *B.* When a mixed vaccine (TAB) was employed from 1916 onwards the incidence of enteric cases became negligible. Certain experiences in the present war in the Middle East with Italian prisoners and British prisoners in Italian hands has shown the superiority of our antityphoid vaccination. In both wars vaccination against plague and cholera has been employed, and in this war against yellow fever when it seems advisable.

In all wars dysentery—amœbic and bacillary—have taken a heavy toll. In the last war bismuth emetine iodide was found to be highly efficacious in the treatment of amœbic dysentery and now we have in sulphaguanidine a remedy of proved value in bacillary dysentery. So also the use of the sulphonamides in the treatment of cerebrospinal meningitis has taken the sting out of a disease whose mortality was so high in the last war (35%). Malaria was one of the major problems of the last war and in Macedonia alone there were 160,000 admissions to hospital in 3 years (1916–18); today with troops even wider spread, it may become responsible for more casualties than any other single factor.

It was only fully realised towards the end of the last war how vast was the wastage from minor ailments. Statistics compiled from admissions to a group of casualty clearing stations showed that 44% of all admissions were due to such diseases as scabies, pyodermia, myalgia, rheumatism and "PUO"; 25% were cases of scabies or some forms of pyodermia, preventable by cleanliness, and the remaining 19% included trench fever, myalgia, rheumatism and PUO. In short, the greater part of a sick wastage of this magnitude was due to disease which could be prevented by personal cleanliness and simple principles of sanitation (History of the Great War (1921–23). The combined work of clinicians and bacteriologists established the entity of two new diseases: trench fever and spirochætosis icterohæmorrhagica.

The experience which physicians and surgeons gained from gunshot wounds of the chest in the war gave an impetus to the development of chest surgery in civilian

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practice. Valuable contributions were made to physiology by the study of organs damaged by war injuries, and injuries of the central and peripheral nervous systems afforded opportunities of physiological as well as pathological study. Injury to peripheral nerves provided abundant material, as Weir Mitchell had found in the American Civil War. Studies of the effects of such injuries contributed more exact anatomical information of the peripheral distribution of the nerves, and threw doubt on the validity of the theory of protopathic and epicritic sensibility.

Observation of the immediate and remote effects of gunshot wounds of the spinal cord contributed to a more exact knowledge of the function of its constituent parts. Among other observations it was shown that after complete severance of the spinal cord the lower limbs might regain their tone and the knee-jerks reappear, if the general condition of the patient remained good and there was no local sepsis such as cystitis or bedsores. This return of limited function refuted Bastian's hitherto accepted law. A "mass reflex" on stimulation of the lower limbs was described in which the legs are withdrawn, the bladder evacuated, semen ejected, and sweating is intense.

Wounds of the cerebrum and cerebellum reproduced conditions comparable to experiments carried out on animals and enabled clinicians to study the functions of these areas, uncomplicated by the effects of pressure seen in the presence of tumours. By such observations light was thrown on the localisation of the visual paths, the mechanism of speech and the cortical representation of sensation (Head, Holmes et. al.).

The first serious attempt to study shock was made in the last war, and physicians, surgeons, physiologists, chemists and pathologists all contributed to it. Hæmoconcentration and the loss of circulating fluid were combated by replacement with gum-saline and tentatively with blood. Today with greater knowledge of the pitfalls of blood-matching, the use of blood, plasma and serum has become routine practice. There is still much to be learned about the clinical recognition of shock and its prevention.

The peripheral vascular disturbances caused by trench foot, shelter foot, immersion foot and frostbite have been widely studied, and improved methods of prevention and treatment have been elaborated. The study of survivors from shipwreck has brought to light the physical and mental tortures through which they have passed, and suggestions have been made to minimise the dangers to which the shipwrecked mariner is inevitably exposed in both hot and cold climates. Injuries by crushing and by blast have been sufficiently frequent in this war to enable the clinical pictures to be recognised, and experimental work is forwarding the elucidation of the physiological and pathological tissue reactions to both varieties of trauma. Aviation medicine has problems of its own because the genius of the engineer tends to outstrip the power of human adaptation to incredible altitude and speed.

Mass experiments in the psychological study of the war worker as well as of those serving in the Forces are being carried out. Problems of feeding and nutrition, of supreme importance during the war, will loom even larger after it. Harvey knew the desolation in Europe during the 30 years' war when he wrote to Lord Dorchester:—

"The miseries of the countries we have passed and the hopes of our good success and all such news your Honour hath from better hands. I can only complain, that by the way we could scarce see a dog, crow, kite, raven or any bird, or anything to anatomise, only some few miserable people, the relics of the war and the plague, where famine had made anatomies before I came. It is scarce credible in so rich, populous and plentiful countries as these were that so much misery, desolation and poverty and famine should in so short a time be, as we have seen, I interpret it well, that will be a great motive for all here to have and procure an assurance of a settled peace. It is time to leave fighting when, there is nothing to eat, nothing to be kept and gotten and the same parties rob on the other if they get but once out of sight." History is apt to repeat itself.

In our attempts to cope with present problems and future difficulties it is only necessary for me to exhort the Fellows and Members of this College to contribute their endeavour in imitation of those benefactors whose example I have so inadequately commemorated.

Lastly, the medical profession is likely to undergo changes which will call for patience and forbearance on the part of every member of it, and the shaping of such changes will be rendered easier if we have that mutual love and affection amongst ourselves which Harvey enjoined upon us, ever remembering that *concordiâ res parvæ crescunt, discordiâ magnæ dilabuntur.*

Before the dawn of another St. Luke's day I trust that we may have the prospect of attaining that place in nature which Harvey (Willis 1878b) thought was man's destiny. "Man," says Harvey, "comes into the world naked and unarmed, as if nature had destined him for a social creature, and ordained that he should live under equitable laws and in peace; as if she had desired that he should be guided by reason rather than be driven by force."

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LOCALISED NEURITIS OF THE SHOULDER GIRDLE

A REPORT OF 46 CASES IN THE MEF

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THE commonest form of neuritis in the MEF is without doubt diphtheritic polyneuritis. The high incidence of this complication with the long disability resulting has received much comment. Acute febrile polyneuritis is rare while polyneuritis following dysentery, malaria and enteric fever has been infrequent. I have not encountered any such cases, and it is interesting to recall that Walshe (1941) recorded that in 4 years with the Egyptian Expeditionary Force in 1915–19 he saw no case of true polyneuritis associated with those diseases. Fibrositis is common but the ordinary clinical forms of interstitial neuritis are not often seen in general hospitals.

TWO GROUPS

A number of cases with unusual neuritic features, however, has come to be recognised in the MEF which, as far as I have been able to ascertain, were not observed before the war in such numbers. The disability has been seen in British, Australian, New Zealand and American troops in the Middle East, and in troops in the United Kingdom. In 2½ years in one military hospital in England I saw 10 such cases. In 9 months in the Middle East I have encountered another 10, and through the courtesy of Brigadier McAlpine, lately consultant neurologist to the MEF, I have been able to study the records of some 80 cases of neuritis of the upper and lower limbs. From this experience and analysis, a fairly clear clinical picture emerged of what might be called localised neuritis of the shoulder girdle. Details of 46 patients are available. They fall into two groups.

In group 1 (26 cases) the affection of the shoulder girdle developed while the patient was in hospital with some other illness. In most cases he had reached the stage of convalescence and in all he was afebrile. A few patients had already been transferred to convalescent depot. No common factor could be detected and in all these cases evidence of faucial or cutaneous diphtheritic infection was lacking.

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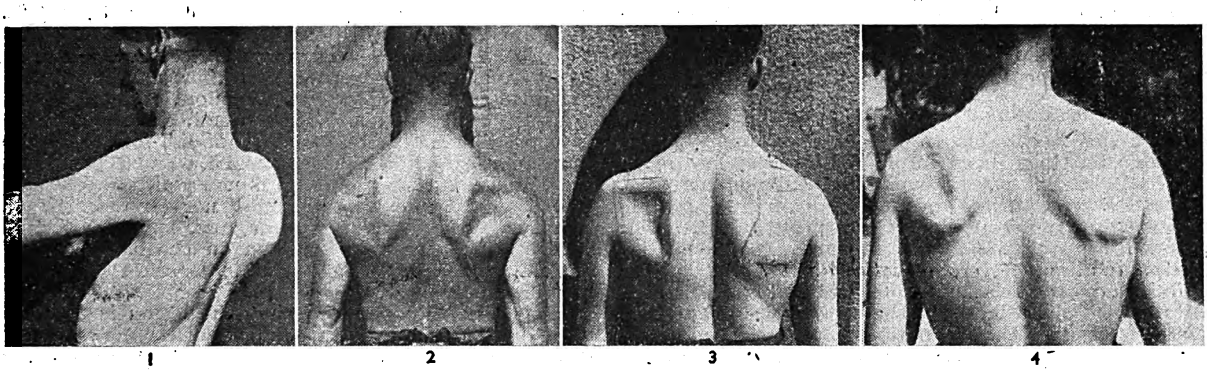

1 2 3 4

Case 1: winging of right scapula. Case 2: wasting of right infraspinatus. Atrophy of left infraspinatus. Atrophy of the left deltoid and spinati.

The conditions for which these patients were receiving treatment were:

Dysentery: bacillary	6	Infective hepatitis	2
amœbic	2	Tuberculous gland of neck	1
Malaria (benign tertian)	3	Typhus	1
Gunshot wounds	3	Pharyngitis	1
Local sepsis	3	Lobar pneumonia	1
Enteric fever	2	Cerebrospinal fever	1

In group 2 (20 cases) the illness began while the patient was on duty in the field. Some of these were admitted to hospital early but most were not admitted until weakness at the shoulder had developed.

CLINICAL FEATURES

In 42 of these 46 cases the onset of the illness was characterised by sharp pain about the affected shoulder. It was felt in one, two or three fairly well-localised points and in some it radiated down the arm. The painful sites were usually to be found along the upper border of the trapezius, over the spinati and the belly of the deltoid. Pain was sometimes felt along the inner border of the scapula, in the axilla or up the side of the neck. Many patients said it was severe and burning and nearly all of them needed analgesics. Morphia was required in 4. The pain was commonly worse at night and disturbed or prevented sleep. It was aggravated by lying on the affected side and persisted acutely for from 3 to 14 days; thereafter it rapidly subsided, but in a few cases a chronic ache with occasional exacerbation was complained of for 6 or 7 weeks. The pressure of braces or the weight of a gun or pack aggravated the discomfort. Carrying a weight on the affected side became impossible. In 4 patients there was no history of acute pain and the disability was not noticed until weakness had developed. I formed the impression that pain was more severe in those muscles which subsequently showed atrophy, with the possible exception of the serratus magnus when pain was often mild or absent.

With one exception, the onset and course of the malady was afebrile. Headache, malaise, sweating, flushing, drowsiness, faucial inflammation, loss of appetite, vomiting and diarrhœa were never observed; nor were stiffness of the neck and spine, diffuse hyperæsthesia or alteration of tendon reflexes. The painful sites were invariably tender but no vasomotor or trophic changes developed in the hand on the affected side. There were no cranial nerve palsies. In 9 cases in which the white cells were counted results were normal. The cerebrospinal fluid was examined in 13 instances, in 7 during the acute phase; in none was there any cellular reaction and in only one was the protein content raised (60 mg.). Weakness about the shoulder girdle usually followed in 4 or 5 days but in a few it seemed to be present on the second day, while rarely it followed after a few weeks had elapsed. The most striking feature of the illness was the frequency with which it resulted in wasting of certain muscles about the shoulder girdle. In most cases this atrophy was considerable and led to much disability. I have never seen any certain restoration of muscle tissue in such cases but in the mild examples there was slow improvement. The right side was affected in 30 patients, the left side in 9 while in 7 the lesion was bilateral (but always asymmetrical). The muscles affected were:

	Cases		Cases
Serratus magnus	34	Trapezius	11
Spinati	24	Sternomastoid	1
Deltoid	17	Rhomboids	?

In 19 instances the muscle or muscles supplied by one nerve only were affected; serratus magnus 13, spinati 2, deltoid 4. No definite weakness or atrophy was ever detected in the pectorals, latissimus dorsi, biceps, triceps, brachialis, brachioradialis or the muscles of the forearm and hand. The legs were never involved. In the absence of involvement of the deltoid no cutaneous sensory alterations were detected. Of 17 patients in whom the deltoid was affected there was sensory loss over the cutaneous zone supplied by the circumflex nerve in 10. It was absent in 3 and not recorded in 4. As would be expected effective movements of the shoulder girdle were greatly hampered. The wasted deltoid with paralysis of abduction, the hollowed supraspinous and infraspinous fossæ of the scapula and the winging of the scapula, alone or in various combinations, produced a striking deformity of the shoulder girdle (figs. 1–6). Atrophy of the serratus digitations could be identified in 2 cases. The lower fibres of the trapezius were affected more often than the upper, and sometimes resulted in slight winging or inward displacement of the inferior angle of the scapula. In one patient wasting

5 6 7 8

Paralysis of right serratus magnus. Atrophy of right deltoid and spinati. Wasting of right trapezius and deltoid. Wasting and weakness of left trapezius and serratus magnus.

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weakness and loss of faradic responses of the sternomastoid was associated with complete trapezius involvement on the same side. In no case was there any convincing evidence of involvement of the rhomboids.

PROGNOSIS AND TREATMENT

I have not been able to follow up these patients personally but have been impressed by the failure to improve in those cases developing obvious atrophy. Mild cases were returned to duty or down-graded while those with a pronounced disability were evacuated. The usual forms of treatment for neuritis in general did not seem to alter the course of the illness. Analgesics, physiotherapy and relaxation of paralysed muscles were prescribed. Relaxation of the serratus magnus is difficult to secure. Several patients showed no improvement after 7 or 8 months. Permanent paralysis of the serratus magnus is such a troublesome disability that the question of transplanting the sternocostal portion of pectoralis major from the humerus to the inferior angle of the scapula, as originally suggested by Sherren, might well have to be considered.

NATURE OF THE ILLNESS

If these patients are seen for the first time some months after the acute phase the malady might be mistaken for poliomyelitis: the end-result can be identical in both diseases. Consideration of a few features, however, should lead to the exclusion of poliomyelitis.

1. There is a striking absence of general signs of infection (such as fever and leucocytosis), and of signs of meningeal irritation.

2. Examinations of CSF, so far as they go, have yielded normal results; but further information is needed.

3. Diffuse hyperæsthesia, so characteristic of poliomyelitis in the acute phase, was not encountered, whereas definite cutaneous sensory loss of peripheral distribution was detected in 10 out of 17 cases where a mixed motor and sensory nerve was involved (for example, the circumflex).

4. The distribution of the paralysis about the shoulder girdle took on a peripheral rather than a segmental character. In 19 patients only one nerve was impaired while the deltoid escaped in no less than 29—a very unusual finding in cervical poliomyelitis.

5. In 26 patients the illness developed while they were convalescing from some complaint—again an unusual finding in poliomyelitis.

6. It would be unlikely to expect so many cases of atypical localised cervical poliomyelitis in the absence of typical examples of the disease at about the same time in the same locality. I have seen 1 case of poliomyelitis during the past 9 months.

It is interesting to compare these observations with those made during the recent epidemic of poliomyelitis in Malta (Tunbridge 1943).

In a series of 58 cases 43 ran a fever for from 2 to 8 days The CSF was normal in 2 instances only; it was examined in 57 patients and showed characteristic increase of protein and cells (up to 900 per c.mm.). In only 7 patients was the disability confined to one arm or shoulder while the deltoid escaped in only one patient out of a total of 36 in whom the cervical cord was involved. Paralysis failed to develop in 2 patients. This low figure is interesting in view of the general awareness of medical officers on the island and the fact that a sharp lookout was kept for early cases. It contrasts remarkably with the experience of New Zealand medical officers in the ME who record that of 40 cases 19 did not develop paralysis. Fever was absent in 4 and headache in only 1 case. Backache was present in 20, spinal rigidity in 16, neck rigidity in 25, photophobia in 17, pain on movement of the eyes in 16 and vomiting in 23 (Caughey 1943). The CSF showed the usual picture of mixed pleocytosis. It is reasonable to conclude therefore that the condition under discussion is not poliomyelitis although no doubt the two diseases can be confused.

The question next to consider is that of acute brachial radiculitis or neuritis. As ordinarily understood these terms imply an interstitial inflammation of the nerve trunks of the brachial plexus or of the emerging peripheral nerves. The clinical features are pain, tenderness, paræsthesiæ and sometimes trophic changes. General weakness of the arm is the rule rather than paralysis of individual muscles while gross permanent atrophy and a peripheral type of sensory loss are rare sequels. Fibrillation and alteration of tendon reflexes are common while there may be evidence of fibrositis elsewhere. Recovery is the rule. This is a sequence rather different from that outlined in this series. The freedom enjoyed by other muscles (pectorals, latissimus dorsi, rhomboids, biceps, triceps, brachialis and brachioradialis) innervated from the same segmental level (cervical 5, 6 and 7) of the spinal cord suggests that the lesion is not a diffuse affection of the brachial plexus or spinal nerve-roots. Isolated paralysis of the serratus magnus, spinati or deltoid muscles can only be explained on the basis of a peripheral mononeuritis and combinations of these would not be unexpected.

It is therefore deduced that the lesion is essentially peripheral. It may begin as a myositis or as a genuine peripheral neuritis. There is no doubt that the nerves (suprascapular, circumflex and long thoracic) themselves are involved in the pathological process. Muscle biopsy in the acute phase might yield some information.

ÆTIOLOGY

The uniformity of the clinical findings in this series is rather striking but this does not necessarily imply a common causation. Indeed these patients may represent a mixed group. What is certain, however, is that such cases were not common in civilian practice before the war. Isolated paralysis of the serratus magnus or spinati was rarely encountered, whereas many medical officers in the Army must have come across cases of this sort during the last 4 years. It would be interesting to know whether the affection has increased in civilian practice and whether it has occurred among Naval and RAF personnel. In respect of the Army patients two considerations spring to mind. Firstly, the upper arm has been subjected to many injections of substances which can produce a local neuritis (TAB, TT, serum, sulphonamides, emetine, quinine, &c.). In this series, however, the occasional examples of obvious association have been excluded; but others may have been included in which this relationship is less apparent. The preponderance of right-sided cases (30) and the selective nature of the muscle wasting suggests that "injection neuritis" is not an important factor.

Trauma also needs consideration. Cases with a history of direct trauma have been excluded from this series, but the problem of repeated minor traumata is difficult to solve. It is quite possible that the long thoracic and suprascapular nerves could be injured by carrying a weight (pack and rifle) across the shoulder. The constitutional type of shoulder girdle and the tone of the supporting muscles might then be secondary ætiological factors. Many of these patients, however, were employed in sedentary posts and it will be recalled that 26 of them developed the illness while convalescing in hospital from some other affection. Nevertheless, I can recall one patient who developed pain in the right shoulder after carrying out pack drill on the first morning of his return to duty after an attack of lobar pneumonia. He rapidly developed an isolated serratus palsy. I have never seen a typical case in an officer, though I understand they have been recorded.

There have been several recent papers dealing with relevant material.

Burnard and Fox (1942) of the New Zealand Medical Corps have published an account of 9 cases occurring in the 2nd New Zealand Expeditionary Force in the Middle East. They are similar to those I have described. The lesion was on the right side in 6 and on the left in 3. In 3 patients the onset was while they were in bed with some other complaint (bronchitis, influenza, and fractured leg). The trapezius was affected in all cases, the spinati in 5, the serratus magnus in 5, the deltoid in 4 (slight involvement only). The rhomboids were not affected but in one patient it was thought that the pectorals were slightly wasted. There was very doubtful wasting (½ in.) of the biceps in 4 and interosseous wasting in 2 patients. The authors noted that recovery was poor and concluded that the lesion was a multiple neuritis in the region of the shoulder girdle.

Richardson (1942) described 9 examples of serratus magnus palsy seen in soldiers at one military hospital in the United Kingdom during one year. In 6 the serratus magnus was the only muscle affected. In one the lower fibres of the trapezius

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were also involved. In another the trapezius, infraspinatus, and deltoid of the other side were wasted while in the 9th case the deltoid and spinati of the opposite side were affected. The lesion was unilateral in 7 and bilateral in 2 patients. The right side was affected in 8 and the left side in 3 patients. A history of trauma was obtained in 1 case, 1 followed an attack of lobar pneumonia and 1 arose during glandular fever. An injection of antitetanic serum initiated another case.

Wyburn-Mason (1941) has drawn attention to the increase in the number of patients suffering from brachial neuritis who sought treatment at the outpatient department of the National Hospital. He saw 42 cases between December, 1940, and August, 1941. In most the paresis was general and in chronic cases it was followed by wasting. In a few patients wasting was limited to the serratus magnus and triceps. Sensory changes of a wide distribution were a constant finding. Prognosis was good in all but severe cases. The author mentioned that in 3 months he had also seen 7 of isolated paralysis of the external popliteal nerve. Foot-drop and characteristic sensory change were recorded and in one patient there was a simultaneous bout of brachial neuritis. None of the patients had had serum injections.

Macpherson and Clark (1943) have seen during one year 10 cases of isolated paralysis of the external popliteal nerve in soldiers serving in Malta. The onset was sudden, painless, and not accompanied by signs of general infection. They noted excellent recovery in all but with a tendency to relapse in a few patients. Over the same period they encountered cases of paralysis of the serratus magnus. One of these followed typhoid fever, one arose during an attack of infective hepatitis and the third appeared spontaneously. I have seen similar cases in the Middle East and the United Kingdom. I have records of 7 examples of paralysis of the external popliteal nerve, 7 of the musculospiral nerve, 4 of the anterior crural nerve, 1 of the lateral cutaneous nerve of the thigh and 1 of the ulnar nerve. The painless nature of the malady and the invariable recovery suggests an ætiology which differs from that of the shoulder-girdle affection. There were no cutaneous sores in these 20 patients.

CONCLUSION

Experience indicates, therefore, that there has been an increase in the incidence of brachial neuritis in civilians in Great Britain and in the incidence of isolated paralysis of individual nerves in the upper and lower limbs of soldiers both at home and in the Middle East.

A group of 46 cases has been defined in which an unusual degree of wasting of certain muscles about the shoulder girdle of fairly rapid onset has been the characteristic clinical feature. In some cases it seems that the disability is permanent.

The causes are unknown in most cases. It is probable that most of the shoulder-girdle cases belong to the same group but their relation to the isolated examples of neuritis of arm and leg is uncertain.

Civilian practitioners whom I have consulted in the Middle East have not seen such cases before and Sir James Purves-Stewart has informed me that in his capacity as consultant neurologist there in 1914–18 he did not see such cases.

I am grateful to Major-General Sir P. S. Tomlinson KBE, DSO, Director of Medical Services, MEF, for permission to publish this paper and to Brigadier D. McAlpine, FRCP, for his advice and suggestions.

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UNIVERSITY OF SHEFFIELD.—The following appointments have been made: Dr. A. I. G. McLaughlin, hon. lecturer in industrial medicine within the department of public health; Dr. P. E. H. Howarth and Dr. R. E. Peasegood, temporary demonstrators in anatomy; Captain J. H. Hale, RAMC, assistant bacteriologist and demonstrator in bacteriology.

OBSERVATIONS ON A TYPHUS EPIDEMIC

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ACTING COUNTY MEDICAL OFFICER OF HEALTH FOR GALWAY

IF history is correct most districts of Ireland must have been the seat of typhus fever at one time or another. With the passage of the century it has, except in a few isolated areas on the Western Seaboard, become almost unknown. Districts in these areas where it has been seen during the past fifty years are subject to constant supervision. A few years pass, perhaps a decade, and gradually the physician's conception of the disease changes from the aberrant forms with which previous epidemics started to the more classical book description. Thus one, two, or more atypical cases are missed and an affection dreaded by these same practitioners is under way again.

In circumstances such as these typhus fever broke out in the Spiddal area of West Galway during the period September–November, 1942. Several inhabited peninsulas, more or less isolated, along the south Connemara coast have experienced sporadic outbursts of the disease during the last decade, but Spiddal has been free since its last serious epidemic in 1903–05. At that time the fever was of a severe type with high mortality and its victims included the practitioner in the area. The last reported case in East County Galway was, as far as I can trace, in 1907 in the Loughrea townland. It seemed to me, therefore, that observations on the 1936 outbreak in Carraroe, the 1941 outbreak in Carna, and the recent Spiddal outbreak might be of interest. While the Spiddal outbreak was in progress a number of articles dealing with typhus appeared in the medical journals and so I had the opportunity of applying to an actual epidemic the professorial conception of the disease.

PLANNING CONTROL

The first 2 cases in the Spiddal outburst presented typical signs and symptoms of bronchopneumonia. They were treated as such and were eventually discharged, typhus being unsuspected. The third case presented all the symptoms of a pelvic abscess. She was fortunately diagnosed on the table before operation. Immediate investigation of the district disclosed the prevalence of what the inhabitants considered "influenza." The symptoms were lethargy, headache, and suffused eyes, the school-going child being especially affected. The school attendance register afforded the names of a considerable number of absentees who, when visited, either gave a history of illness or were actually ill. Those who were pyrexial presented a bluish-red to a slaty-blue rash in the epigastric region. Those who were convalescent gave a history of "influenza" with signs and symptoms such as those found in pyrexial cases; they looked anæmic, and were lethargic with a generalised mottling very like louse-bites. Others gave a similar history but presented no mottling. The onset of the disease in all was abrupt. In the course of investigations I visited a house one evening. Not having any proteus suspension with me I deferred a blood-slide test to the following day. When I called next morning all were acutely ill though on the previous day they had all been well and attending to routine duties. It was necessary at this stage to consider the means of detecting all possible cases and especially ambulant ones with few signs or symptoms. The slide-test was a help for the actual case, but what interpretation was to be given to the standard test which afforded agglutination to a proteus suspension of 1/50 in the ambulant person?

To collect and remove to the fever hospital those who were ill was a straightforward proposition; to detect those who had the disease but concealed it, or those who were incubating it, was a much different one. We had to decide first what we would accept as a diagnostic titre with the Weil-Felix test. Our plan of campaign was to do a Weil-Felix test on every contact, every child suspect in the area, and the occupants of all houses in which there was a history of illness within the previous two months or in which the state of cleanliness did not conform to average standards. A survey of the area revealed there were 535 such persons out of a population of 2222. An auxiliary fever hospital was

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established in the area for cleansing, disinfesting and disinfecting, and for observation of doubtful cases; it was staffed with young fever-trained nurses having experience of typhus. Such a field unit has long been prominent in the recommendations of the chief medical adviser of the Local Government Department and this epidemic established its value beyond the slightest doubt.

Topley and Wilson[1] apropos of the Weil-Felix test write:

"A positive reaction at 1/25 during the first week of the disease may be considered as a presumptive positive, though it appears that about 7 to 9% of persons not suffering from typhus may react at this titre. As a rule the titre rises rapidly, so that a positive diagnosis 1/50 or higher can generally be made by the 8th day."

This we accepted as our standard but with the reservation to do a cross-section survey of the county later and check up on the reaction of patients who had typhus in previous years. The results of this survey I mention below. Any person, therefore, yielding a positive Weil-Felix 1/50 to a *Bacillus proteus* OX 19 suspension we brought in with his contacts to the auxiliary hospital. If, 2 days later, the titre of Weil-Felix rose above 1/50 we transferred that case to the central fever hospital. Bloods that yielded a doubtful reaction we referred for further Weil-Felix tests to extern pathologists. All negative were allowed to go home, their houses, clothing, and goods having been thoroughly treated during their period of detention. The district was, of course, isolated from the first suspicion of the disease, no person being allowed in or out except those who were certified by us as being non-contacts, having an absolutely negative Weil-Felix reaction, and whose clothing was subjected to steam disinfection. Isolating an inland area has difficulties but a coastal area presents the further problem of boat-control. It is recorded that in the 1860s when a major epidemic of typhus occurred in this locality a number of people sailed across the bay to another county and temporarily settled there with disastrous consequences to their new neighbours. All precautions to prevent this, however, were taken by us in this epidemic.

FINDINGS

In all, specimens of blood from 535 persons were examined by us for the Weil-Felix test. Of these people, 14 were typically ill with typhus and gave reactions varying from 1/150 to 1/3000 using *B. proteus* OX 19 suspension. One person of this group who was typically ill gave, on the second day of his illness, a positive reaction to 1/50 only. Of persons with a history of illness in the preceding month 89 gave positive Weil-Felix reactions varying from 1/50 to 1/350 to the same suspension, and 30 gave a negative reaction. With a history of illness in the previous two months 110 gave reactions as follows: 3 reacted to a titre of 1/12; 9 to a titre of 1/25; 7 to 1/50; 14 to 1/100; and 77 were negative. The bloods of those with no history of illness gave the following reactions: 8 agglutinated to a titre of 1/12; 3 to 1/25; 16 to 1/50, and 265 negative.

As regards the degree of verminous infestation of these 535 people: 289 showed verminous heads; 200 showed body lice; and 46 were clean; 2 of those who were clean gave a Weil-Felix reaction, one to 1/25, and the other to 1/50. It was observed that those who were most grossly affected with head and body lice (and this number did not exceed 15), yielded a negative Weil-Felix and had no history of illness. It seems surprising to me that these lice should have escaped infection, especially as the hosts were ambulant and freely mixed with the population. Out of a total population of 2222 about 22% had head and body lice which is not an excessive figure when one considers that in very many instances the housing conditions were very poor. As regards the lice collected in a test-tube from actual cases, no pinkish coloration was noticed, but when examined again two days later they appeared to be swollen. There was only one death in this epidemic, a boy aged 14½. Two patients had had the disease before, in 1903.

1. Topley, W. W. C. and Wilson, G. S. Principles of Bacteriology and Immunity, London, 1936, vol. II, p. 1200.

In the Carraroe outburst of 1936 there were 5 cases, all adults. The first was diagnosed as "carditis." This patient's wife, who also contracted the disease, had given nursing care to an old couple who had died a month before, and in view of the end-results there can be little doubt that they died of typhus; 2 others of the 5 who contracted the disease had attended the wake of the old couple; 1 of the 5 died. From the 4 cases who survived the infection I took samples of blood for Weil-Felix test in November, 1942. The results obtained were: 2 agglutinated *B. proteus* OX 19 in a titre of 1/50, one in 1/125, and one in 1/25.

In the Carna outburst of 1941 there were 8 cases, all adults. The first patient observed was the district nurse who was suffering from typical typhus, and who had been attending a tailor's household for illness resembling influenza. This household fell ill a fortnight after the death of the father, who had not summoned medical attention. It is presumed this man died of typhus but he is not included in the series of 8. There were no deaths among these. From 7 of them specimens of blood were taken and examined on Dec. 19, 1942; 1 gave a positive Weil-Felix 1/125; 5 gave 1/50; 1 1/25.

As stated above we decided to check on Weil-Felix results in non-typhus areas. The first area selected was in the western portion of the county in which families from poorer parts of Connemara were given land settlements. Families from the Lettermore area (which includes Carraroe) were selected for the blood test. A member of one of these families was contact to the epidemic there in 1936, and she yielded a positive 1/50 though she had been removed from the area for two years without further association with it in the meantime. Vermin were found on her; the 14 others tested were negative and averagely clean.

The next area selected was in the eastern portion of the county and here 20 children of the poorer class, showing evidence of vermin, were chosen for the test; 9 of these were found negative; 7 yielded a positive 1/12; and 4 yielded a partial-positive 1/20. There was no history of illness simulating influenza or typhus in the area.

An area in the most eastern portion of the county was now selected and 9 children were specifically chosen, 3 being exceptionally clean and well-nourished, and 6 being under-nourished, none too clean, showing evidence of vermin, and their parents unemployed. Of the latter group 2 specimens of blood proved unsuitable for examination. Not 1 of the rest of the dirty group gave a positive reaction to *B. proteus* OX 19 although 3 showed a titre of 1/25 to *B. proteus* XK. Of the clean children 1 gave a positiye reaction of 1/125, the other 2 being negative. The boy showing the positive result had no history of illness.

In the north-eastern portion of the county a further district was selected and 9 children were chosen whose standard of cleanliness was the reverse of those dealt with in the last district—i.e., 6 were clean children, and 3 dirty, undernourished, and of unemployed parents. The children of the dirty group were all negative; 2 of the clean group gave agglutination to a titre of 1/25 *B. proteus* OX 19.

The figures quoted in the four areas above referred to must not be taken as a true index of the general standard of cleanliness, or uncleanliness, in the county at large, or in the particular areas, as the children were specially selected by us for the purpose of our test.

I consider it noteworthy that there is an obvious difference in dress between the affected people of the typhus sections of Connemara seaboard and the rest of County Galway. The underclothing worn by the former is of heavy closely-woven material, difficult to wash thoroughly and seldom changed, the same garments being worn day and night for long periods; on the other hand, those of the other areas wear lighter materials and often change their clothes or, should they have no change, at least turn them inside out so that a cleaner appearance is presented.

SUMMARY

Typhus in County Galway invariably makes its appearance in an aberrant form, thereby becoming established notwithstanding constant vigilance for signs or symptoms suggestive of it.

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In periods between epidemics it appears to be kept alive in the area by conditions simulating colds or influenza, and being mild, without any mortality, is undetected, as such cases do not seek medical advice.

A Weil-Felix giving a positive reaction of 1/50 to a *B. proteus* OX 19 suspension, when associated with illness of even the severity of a cold or mild influenza, should be accepted as diagnostic and all precautions taken until a second test is done some days later. Should the titre then rise the evidence is conclusive.

The Weil-Felix reaction does not completely disappear within 6 years of the occurrence of the disease.

A second attack of typhus is possible, 2 such cases having occurred in the Spiddal area.

In all, 53 persons were examined from non-typhus areas. Of these, 3 gave a positive Weil-Felix reaction —1 at 1/125, 1 at 1/50, and 1 at 1/25. We considered the 1/25 reaction of no diagnostic import, the child being clean, well-nourished and having no history of illness. The person who gave the 1/50 was a known contact to the Carraroe epidemic in 1936. No reason can be advanced for the other case who was clean, well-nourished, and who had no history of illness, or contact with either a typhus patient or a typhus area.

RICKETTSIAL AGGLUTINATION STUDIES IN TYPHUS FEVER

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INVESTIGATIONS have been carried out upon the sera of certain patients convalescent from attacks of typhus fever contracted in the Spiddal area of Galway in 1942 as reported by McConn (1943). These studies formed part of a more extensive survey of the antibody response to infection and immunisation by rickettsiæ of the X19 group, but they yielded results which were considered sufficiently interesting to warrant separate publication.

Convalescent sera, which were collected at intervals of 2–5 months after the subsidence of fever, were examined for agglutinins to the OX proteus organisms, and to murine and epidemic rickettsiæ.

The proteus tests were carried out in the usual manner with alcoholised suspensions incubated at 50° C. for 4 hours and at 37° C. overnight.

Rickettsial suspensions were made by repeated centrifugation of lung emulsions of mice infected intranasally (Hudson 1940). The final washed deposit at 4000 r.p.m. was suspended in normal saline buffered to a pH of 7·3 with phosphate buffer; after incubation at 37° C. for 4 hours, to facilitate the flocculation of mouse protein, it was stored at 2° C. The supernatant was diluted to the desired opacity for use without formolisation or other chemical treatment and was used after 4 or 5 days' storage when the organisms were usually dead. Doubling dilutions of sera were made, an equal volume of suspension added, and incubation was carried out in Dreyer's tubes at 40° C. for 18 hours in a water-bath. The results are shown in table I which gives the titre of a serum as the reciprocal of the highest dilution (final) with which agglutination was distinctly visible with a hand-lens.

The murine strain was the Wilmington (US) strain, and two epidemic strains were employed—namely, the classical Breinl strain first isolated 15 years ago and a strain recovered from a case of louse-borne typhus in Cairo in 1942 by Major C. E. van Rooyen, RAMC.

Significantly elevated OX19 titres in excess of 50 were present in five of the nine cases and high OX2 titres in two of these and in one other. No case exhibited a high OXK titre. Rickettsial agglutinins were present in seven sera when examined with the Cairo strain, and two of these showed no reaction with Breinl or murine strains. Five of the sera reacted with all three rickettsial strains, and four of these showed a higher titre with the epidemic than the murine organism, the remaining serum having similar titres with all three strains. The intensity or completeness of agglutination in these five sera was also less with the murine than with the epidemic strains, and in two instances traces only of agglutination were obtained with the murine organism, whereas both epidemic strains gave two-plus (+) agglutination.

These results amply confirmed the belief that some at least of the patients had been infected by rickettsiæ of the X19 group, although the time of this infection could not be stated precisely in the absence of knowledge of the agglutinin titres during the early stages of the recent illnesses.

SIGNIFICANCE OF THE SEROLOGICAL RESULTS

Agglutination of rickettsiæ by human sera has in the past been studied chiefly in regions where typhus is endemic, and it is stated (Mosing 1938) that the test is a more trustworthy guide to infection than the Weil-Felix test. Tests made by us with rickettsial suspensions prepared as above indicate that sera from persons not exposed to rickettsial infection do not usually agglutinate rickettsiæ, although they often agglutinate proteus OX19 in dilutions of 1 : 20 to 1 : 40. Only 2 out of 45 sera from normal individuals showed weak agglutination of murine (but not epidemic) rickettsiæ, in dilutions not exceeding 1 : 40.

For a short time after inoculation with typhus vaccine (Cox type, 1939) most individuals had demonstrable agglutinins to the homologous rickettsiæ in titres of 40 to 320, and the appearance of these agglutinins was often associated with an increase in the OX19 agglutinin, usually two-fold in degree. Laboratory infection in inoculated persons working with rickettsiæ (Van den Ende et al. 1943) was consistently accompanied by the development of potent rickettsial agglutinin, although the OX19 agglutinin did not increase to the same degree in some of them. Sera from cases of typhus in the Middle East and elsewhere showed both rickettsial and OX19 agglutinins, and in these cases the titres of proteus agglutinin were often very high (640 to 10,000). Experimental infection of guineapigs and rabbits with rickettsiæ produced sera which were consistent in possessing rickettsial agglutinins but which had either no agglutinin or a weak titre of agglutinin to OX19.

TABLE I—AGGLUTINATION OF PROTEUS AND RICKETTSIA BY SERA OF IRISH CONVALESCENTS

Case	Duration of convalescence (months)	Proteus			Rickettsiæ		
					Murine	Epidemic	
		OX19	OX2	OXK		Breinl	Cairo
T. 1	3	500	125	50	160	640	640
T. 2	3	50	125	50	40	320	160
K. 1	4	125	50	50	0 (20)	0 (40)	0 (40)
K. 2	5	250	50	25	80	320	160
O'D. 1	2	250	25	25	80	80	80
O'D. 2	2½	250	125	25	80	320	80
O'D. 3	2½	25	25	25	0 (20)	—	0 (20)
L. 1	2	0 (25)	0 (25)	0 (25)	0 (20)	0 (40)	40
L. 2	2	50	50	50	0 (20)	0 (40)	80

Figures in parentheses give lowest dilution of serum tested which failed to give agglutination.

Table II, which sets out the results with representative sera from animals and from humans, indicates that the antibody response, as demonstrated by the agglutination of unmodified rickettsiæ, is relatively specific for the particular species of rickettsiæ concerned. Completely specific sera have not been encountered in either rabbits or humans, whose sera usually show a difference in titre of from four to eight-fold in favour of the homologous species. Yet convalescent sera from guineapigs infected with epidemic rickettsiæ have frequently no demonstrable agglutinins to murine strains, although they always agglutinate epidemic rickettsiæ. The two species of rickettsiæ, *R. prowazeki* and *R. mooseri*, which have long been known to possess common antigens (Zinsser and Castaneda 1932), thus appear to have specific antigens as well. Proof of the independence of these antigens has been sought by means of cross-absorption tests on guineapig and rabbit sera, and these have shown an inability of the heterologous rickettsia in each case

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to remove the agglutinin for the homologous species although it is capable of removing agglutinin for itself. The homologous rickettsia removes agglutinin for both species. Similar results are reported by Plotz (1943) who employed the complement-fixation reaction to demonstrate the specificity of rickettsial antigens.

Thus far, insufficient sera from cases of human typhus, proven by the isolation of the causative rickettsiæ, have been examined for final conclusions to be drawn on the specific nature of the antibody response in man. The agglutination tests with sera from two individuals whose infecting strain was isolated and classified by Major van Rooyen on the basis of guineapig response are shown in table II. The results with these sera, and

TABLE II—AGGLUTINATION OF RICKETTSIA AND PROTEUS BY SERA FROM VARIOUS SOURCES

Serum		Rickettsial agglutination		Proteus OX19
Source	Nature of infection or inoculation	Murine	Epidemic (Breinl)	
Guinea-pigs				
220	No infection	0 (20)	0 (20)	0
146	Convalescent murine typhus	640	80	—
71	Convalescent epidemic typhus (Tunis)	0 (20)	160	0
Rabbits				
121	Inoculated living murine yolk-sac. 1 dose IP	1280	160	—
41/42	Ditto. 3 doses IP	320	160	50
27	Inoculated living epidemic yolk-sac. 1 dose IP	80	320	—
39/42	Ditto. 3 doses IP	160	640	0
101	Inoculated formolised murine rickettsiæ. 3 doses IV	640	160	—
38/42	Inoculated formolised epidemic rickettsiae. 3 doses IV	640 (tr)	1280	—
Human				
S	Laboratory infection (murine) 14th day *	640	320	40
R	Ditto (epidemic) 12th day *	80	640	50
T	Middle East murine typhus 21st day †	2560	640	2500
Y	Middle East epidemic typhus 24th day †	1280	10,240	5000
P	Inoculated formolised epidemic rickettsiæ (Cox) 3 doses SC	80	640	80

* Cases in workers previously immunised with epidemic vaccine.

† Sera from Middle East sent by Major van Rooyen who isolated typhus strains, respectively orchitic and non-orchitic, from the blood.

IP = intraperitoneal. IV = intravenous. SC = subcutaneous.

with sera from cases of laboratory infection and from inoculated persons, have yielded presumptive evidence that human cases of typhus can be classified by means of rickettsial agglutination into murine and epidemic types.

The Irish cases of typhus were, on this basis, classified as infections due to epidemic rather than to murine rickettsiæ. Final proof must await the recovery of the causative organism in Irish typhus and study of its behaviour and serological structure.

DISCUSSION

Until recently the only laboratory method available for the differentiation of human typhus into epidemic and murine types was the classification by guineapig reaction of the strains of rickettsiæ recovered from the patients into non-orchitic and orchitic categories. Plotz (1943) showed by means of the complement-fixation reaction that rickettsial antigens could be used to demonstrate specific differences between the two species of rickettsiæ, and that the results with human sera indicated that Brill's disease was serologically related to epidemic rather than to murine typhus. The results of agglutination tests described above on sera from experimentally infected animals, and of absorption tests upon these sera, indicate that rickettsial agglutination is another possible method of demonstrating specific differences between *R. prowazeki* and *R. mooseri*. The application of these findings to human cases of typhus suggests that rickettsial agglutination can be employed to differentiate epidemic and murine typhus and thus to throw light on the epidemiology of the disease.

The data indicate that the cases of typhus in Galway were due to *R. prowazeki*, and this agrees with the observation of McConn (1943) that the disease was louse-borne. As there had been no epidemic in this area since 1905, the incrimination of epidemic rickettsia as the causative organism of the recent outbreak raises the problem of the mode of survival of the organism in inter-epidemic periods.

In the first place, it appears impossible to rule out the occurrence of sporadic cases of typhus in Ireland in the inter-epidemic period. Mosing (1938) described the atypical character of epidemic typhus in Poland before the war and found that the Weil-Felix test often gave equivocal results in such cases. The essentially benign character of the Spiddal outbreak and the particular affection of children attending school certainly suggest that the population had been partially immunised by previous attacks of the disease.

Secondly, even in the absence of actual cases of the disease, rickettsiæ can remain viable in several ways. Zinsser's observations on Brill's disease (1934) showed that latent infection must at times follow an attack of the epidemic form of typhus in man, while in murine typhus the rat forms a similar reservoir of infection. There is however no proof that a human reservoir could give rise to an epidemic of typhus, for Mosing (1938) was unable to infect lice by feeding them on human typhus convalescents. Dried infected louse fæces which, are known to remain infective for long periods (Arkwright and Bacot 1923, Starzyk 1936, Fejgin 1936) might initiate an infection which could spread by lice and thus they provide a further mode of survival of rickettsiæ between outbreaks or sporadic cases.

SUMMARY

1. Rickettsial agglutination tests with sera from animals experimentally infected with typhus indicate specific differences between epidemic and murine rickettsiæ.

2. Human cases of typhus have been classified by means of rickettsial agglutination tests, and the recent cases in Galway have been found to belong to the epidemic serological type.

3. The bearing of these observations upon the epidemiology of the disease is briefly discussed.

The Irish sera were received by the courtesy of Dr. C. F. McConn, acting MOH for Galway, and Prof. R. A. Q. O'Meara of Trinity College, Dublin, to whom we wish to express our best thanks. Sera from the Middle East have been received by the kindness of Major C. E. van Rooyen, RAMC, and the courtesy of Colonel J. S. K. Boyd, OBE, DDP Middle East Forces. We wish to thank the Director of Pathology, Major-General L. T. Poole, DSO, MC, KHP, for providing facilities for the experimental work and for his never-failing interest.

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LECTURES ON POSTWAR RELIEF.—On Oct. 25 Dr. N. M. Goodman gave the first of these lectures which are being held at the Royal College of Nursing, 1a, Henrietta Place, London, W.1, on Mondays at 2.30 PM. Dr. Goodman spoke on health in Europe and other lecturers are to include Miss Evenson (matron-in-chief of the Norwegian nursing service), Miss Zaphiriou (Greece), Miss Paskuszova (Czechoslovakia), Nurse Godlowska (Poland), Mlle Janssens (Belgian Red Cross), Dr. Joles (Netherlands), and Prof. J. R. Marrack. Tickets for the lectures, which are open without fee to nurses of allied or enemy-occupied countries, may be obtained from the director of the education department at the college.

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COSTOCLAVICULAR COMPRESSION OF THE SUBCLAVIAN ARTERY AND VEIN

RELATION TO THE SCALENUS ANTICUS* SYNDROME

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A NUMBER of views have been put forward as to the mechanism of the vascular disturbances produced in the arm by a cervical rib or sometimes by a first thoracic rib. The purpose of this paper is to describe 3 cases in which there was evidence of intermittent compression of the subclavian artery and vein between the clavicle and first thoracic rib. In order to elaborate certain observations made in these cases, a fourth is described with neurological disturbances only. Our observations indicate that the most common view which considers that these vascular disturbances are connected with spasm of the scalenus anterior muscle is not applicable to all cases.

CASE 1

A healthy well-built man, aged 28, in the middle of June, 1942, suddenly noticed pain and tinglings in the ring and little fingers and outer border of the thumb of the left hand while performing his accustomed canteen duties. That night the pain kept him awake, forcing him to walk up and down nursing his arm. Next day at times the whole hand felt numb below the wrist, at other times as the numbness was passing off he would have an intolerable aching pain in the hand which shortly disappeared when it became "alive" again. During the following few days the numbness, paræsthesiæ and pain lessened, but his left hand seemed weaker and colder than before. Often his hand would turn blue with the cold, though it never went white. He was given massage and physiotherapy with only slight benefit, and as improvement was delayed he was transferred to a military hospital on Sept. 17, 1942.

Examination showed slight wasting of the muscles of the left forequarter without specific wasting of any particular group. The left hand was colder and bluer than the right; this was confirmed by thermocouples which showed at room temperature a difference of 6° C. between the skin temperatures of the fingers of the two hands, a difference which diminished to a constant of 2·5° C. after the patient's trunk had been heated under a hot-air cradle for 2 hours. There was weakness of the forearm muscles, and a "glove" type of cutaneous sensory impairment to pinprick and cotton-wool over the forearm and hand. Electromyograms of the left arm muscles were normal (Weddell et al. 1943), and there was no significant difference in the sweating reactions of the two sides (chinizarin method; Guttmann 1940). On hyperextension of the neck (Adson and Coffey's manœuvre 1927) or on posterior abduction of the shoulders (Eden's manœuvre 1939) the pulsation of the brachial, radial and ulnar arteries disappeared in the left arm but not in the right. X rays of the neck showed no cervical rib but an asymmetrical thoracic inlet; the left first rib was less oblique than the right and its anterior end together with the medial end of the left clavicle was higher than on the right side (fig. 1). The diagnosis made was scalenus anticus syndrome with involvement of the subclavian artery.

On Oct. 11, 1942, the lower part of the left posterior triangle of the neck was explored under local anæsthesia through an incision just above and parallel to the middle third of the clavicle. The external jugular vein was divided, the clavicular head of the sternomastoid muscle severed, and the posterior belly of the omohyoid muscle retracted upwards. After the phrenic nerve had been identified and retracted medially, the scalenus anterior muscle, the third part of the subclavian artery and the trunks of the brachial plexus were clearly defined. The patient was then asked to hyperextend his neck. The scalenus anterior muscle, which was of normal size, contracted vigorously but the pulsations of the third part of the subclavian artery were only very slightly diminished; the radial pulse, however, completely disappeared. The scalenus anterior muscle was stimulated faradically, but its contraction had no effect on the subclavian or radial pulse. The scalenus anterior muscle was then divided just above the first rib, revealing that there had been an appreciable interval between the scalenus anterior and medius muscles, in which the subclavian artery and brachial plexus had lain without compression or undue angulation. It was now apparent that there was a slight fusiform dilatation of the subclavian artery between the lateral border of the scalenus anterior muscle and the lateral edge of the first rib; the circumference of this part of the artery was 5 mm. greater than in the second part. The lower trunk of the brachial plexus crossed the rib behind it without tension. The patient again hyperextended his neck and again the radial pulse disappeared. This confirmed that the now divided scalenus anterior muscle had not been responsible for the arterial compression. During this manœuvre the space between the back of the clavicle and the outer edge of the first thoracic rib at the level of the subclavian artery narrowed down, nipping the forefinger inserted into it. This space was therefore measured with a series of instruments employed as "feelers"; with the arm lying loosely by the side it measured 1·7 cm., whereas with the arm forcibly abducted in a posterior direction or with the neck extended it narrowed to 0·7 cm. These observations indicated that the subclavian artery was being nipped between the clavicle and the rib. A segment of rib 2·5 cm. long (indicated in fig. 1), with its periosteum, was removed from beneath the subclavian artery and brachial plexus, leaving a gutter into which these structures sank. Posterior abduction of the shoulder now no longer affected the radial pulse. While the rib was being resected an intravenous anæsthetic was given; during this stage a small tear was made in the pleura resulting in a pneumothorax. Convalescence was straightforward except for temporary slight lower chest pain.

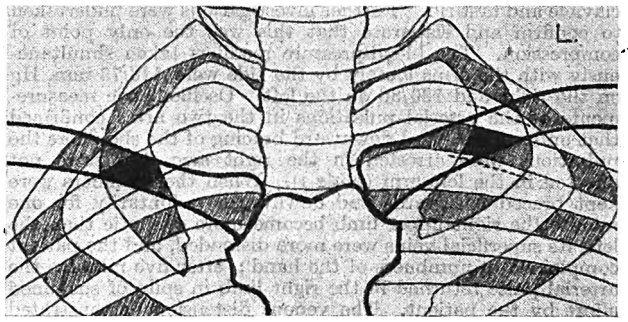

Fig. 1—Case 1. Tracing of radiogram showing asymmetry of thoracic inlet. The dotted lines enclose the resected part of the left first rib.

Next day both radial pulses felt equally strong and the left one no longer disappeared on active movements either of the neck or shoulder; the motor weakness and sensory loss had also disappeared. The temperature of the left hand rose steadily, so that 4 weeks later the skin temperature readings were equal on the fingers of the two hands, both at room temperature and after heating. Oscillometry showed that the arterial pulsations in the left arm were still a little less vigorous than in the right arm, but were damped down only slightly on hyperextension of the neck or on bracing the shoulders back.

Comments.—In this case contraction of the scalenus anterior muscle either voluntarily or on faradic stimulation was not responsible for the obliteration of the radial pulse. The left subclavian artery was compressed between the outer edge of the first rib and the back of the clavicle during hyperextension of the neck or by forcibly bracing the shoulders back. This compression was completely relieved by removal of a segment of rib from beneath the subclavian artery. The ætiological factor leading to compression of the subclavian artery on the left side but not on the right was an asymmetry of the thoracic inlet.

CASE 2

A sedentary worker of slender build, aged 20, was admitted to a military hospital on Dec. 20, 1942. He had joined the Army 6 months before admission and soon found that after marching for more than 10 minutes his right hand would become numb and weak and tinglings would appear in the fingers. He experienced a similar sensation whenever he wore a heavy pack braced across his shoulders. He had never had any similar symptoms in civil life, nor had he had symptoms in his left hand. The only relevant fact in the

* In the modern terminology this muscle is known as the scalenus anterior.

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past history was that he had fractured his left clavicle 14 months earlier.

The contours of the two arms were equal, and there was no evidence of wasting, weakness or sensory change. At rest the arterial pulses in each upper limb could be easily palpated, but every time he braced his shoulders backwards and downwards the pulsations of the brachial, radial and ulnar arteries on the right side instantly disappeared, whereas on the left side they were unaffected. During this manœuvre the third part of the right subclavian artery continued to pulsate vigorously. When the observer placed his index fingers above the middle third of the clavicle on each side, the interspace between the clavicle and first rib could be felt to narrow and disappear on the right side, but not on the left. In this case, contrary to what had happened in case 1, hyperextension of the neck had no effect on the pulses. X rays of the neck showed a symmetrical thoracic inlet without cervical rib, but the left clavicle was bowed forwards as a result of the old fracture. No differences were noted in the sweating responses of the two limbs, and the skin temperatures of the two hands were equal at room temperature and after heating.

From these observations there was strong circumstantial evidence of compression of the subclavian artery between clavicle and first rib. Further investigations were undertaken to confirm and elaborate that this was the only point of compression. The blood-pressure readings taken simultaneously with the arms loosely by the side were 118/75 mm. Hg on the right and 120/80 on the left. Oscillometric measurements of the arterial pulsations in the two arms confirmed that on backward and downward bracing of the shoulders the pulsations were arrested in the right arm, but were not affected in the left arm (table 1). When the shoulders were kept braced backwards and downwards voluntarily for one minute the right upper limb became more cyanotic than the left, its superficial veins were more distended, and the patient complained of numbness of the hand; after five minutes the arterial pulse returned in the right limb in spite of sustained effort by the patient. The venous distension demonstrated by this manœuvre was further studied by infrared photography (figs. 2 and 3). This revealed that during this test collateral venous channels were being utilised. On the right side the basilic vein and other superficial veins of the arm drained via the superficial pectoral veins to the venous channels at the base of the neck, and not into the deep veins of the axilla as in the normal subject. It was thus evident that there was a venous obstruction as well as the arterial one, and it was presumed that the subclavian vein was being compressed by the same mechanism as the artery—an approximation of the clavicle to the first rib. The influence of the

TABLE I—OSCILLOMETRY IN CASE 2 (PACHON OSCILLOMETER)

Pressure in mm. Hg	Oscillometric index		Pressure in mm. Hg	Oscillometric index	
	With arms at rest	With shoulders braced backwards		With arms at rest	With shoulders braced backwards
	Right arm			*Left arm*	
100	5	0	100	4½	3½
80	4	0	80	3	2
60	1½	0	60	1	½
40	½	0	40	½	½

scalenus anterior in these manœuvres was then investigated by paralysing the muscle with an infiltration of 10 c.cm. of 1% procaine as advocated by Gage (1939). After complete paralysis of this muscle was obvious to palpation and had been confirmed by electromyography, the various manœuvres were repeated and obliteration of the arterial pulses and venous engorgement were again found to occur on the right side.

Operation was then considered, but was thought to be unwarranted. The symptoms appeared only when the patient was marching or carrying a heavy pack. Moreover, he had finished his preliminary training and was returning for non-combatant duties to a unit where it was clear that he could perform his work satisfactorily without symptoms.

Comments.—In this case there is strong evidence of a compression of both the right subclavian artery and vein between the clavicle and first thoracic rib during backward and downward bracing of the shoulders. The right scalenus anterior muscle was proved to have no influence on the compression of the artery and vein during this manœuvre. The left subclavian vessels were probably spared owing to the forward bowing of the clavicle resulting from a previous fracture.

CASE 3

A member of the WAAF, aged 22, was admitted to a military hospital on Dec. 17, 1942, complaining of clumsiness of the left hand for a year. The hand always felt cold. For the previous 4 months she had noticed pins and needles extending down the inner border of the forearm to the tips of the medial two fingers whenever the arm hung by her side. These paræsthesiæ were relieved by elevation of the limb.

Examination showed well-marked weakness and wasting of the intrinsic muscles of the left hand and ulnar side of the forearm, with gross wasting of the opponens and abductor pollicis muscles of the type described by Wilson (1912) as often associated with cervical rib. Electromyography showed numerous fibrillation action potentials in these two muscles and no motor unit activity; in the remaining hand muscles there were no fibrillation action potentials but reduced motor unit activity, which suggested a nerve block without structural damage. There was slight impairment of sensibility to pinprick and cotton-wool over an ill-defined area comprising all fingers and the ulnar border of the left forearm. There was spontaneous sweating on the palms of both hands, left more than right, and after heating a relative hypohidrosis over the whole left little finger. Both hands were cold but showed equal skin-temperature readings, at room temperature and after heating. X rays of the thoracic inlet showed bilateral rudimentary cervical ribs; the left measured 3 cm. and the right 2·2 cm. ('Precision' stereoscope of Caldwell and Molly). The thoracic inlet formed by the first thoracic ribs was asymmetrical; as in case 1 the left first rib appeared shorter and less oblique than the right, and its anterior end together with the medial end of the left clavicle was on a higher level. An attempt was made to measure radiologically the interspaces between the clavicle and first rib in the region of the groove for the subclavian artery with the precision stereoscope. It proved technically impossible to identify accurately the nearest opposing points on the two bones to ensure an absolute measurement. An estimate of the space between the upper border of the clavicle and the outer edge of the first rib at rest was 1·4 cm. on the left and 1·7 cm. on the right. After hyperextension of the neck it narrowed to 1 cm. on the left and 1·2 cm. on the right. These figures confirmed the asymmetry of the thoracic inlet and indicated that the space between rib and clavicle was narrow.

On hyperextension of the neck, or on backward and downward bracing of the shoulders, the pulsations of the brachial and radial arteries of the left arm disappeared. On the right side the corresponding arterial pulsations as measured by oscillometry diminished but did not disappear. There was evidence of intermittent venous obstruction on the left side similar to that in case 2 after both shoulders had been braced backwards for a minute, and this was confirmed by infrared photography. The clinical picture was thus one of neurological disturbances without persistent vascular changes.

At operation on Jan. 19, 1943, the scalenus anterior muscle, subclavian artery and brachial plexus on the left side were explored under local anæsthesia by an approach similar to that employed in case 1. During backward and downward bracing of the shoulders and hyperextension of the neck the scalenus anterior muscle contracted, the pulsations of the third part of the subclavian artery diminished perceptibly, and the radial pulse disappeared. The interspace between rib and clavicle at the level of the subclavian artery was estimated as in case 1: at rest it measured 1·8 cm.; when the shoulders were braced backwards and downwards it narrowed to 0·6 cm. Opposite the subclavian vein there was at rest an interval of 0·6 cm.; on backwards and downwards bracing of the shoulders this narrowed to less than 0·4 cm. Next the scalenus anterior muscle was stimulated with a powerful faradic current and its vigorous contraction was accompanied by complete disappearance of the pulsations of the third part of the subclavian artery. It was also noticed that the lower trunk of the brachial plexus, with the second part of the subclavian artery interposed between it and the contracting scalenus anterior muscle, was being compressed against the tip of the cervical rib. An intravenous anæsthetic was then given and the scalenus anterior divided above the first rib. The lower trunk of the brachial plexus was seen to

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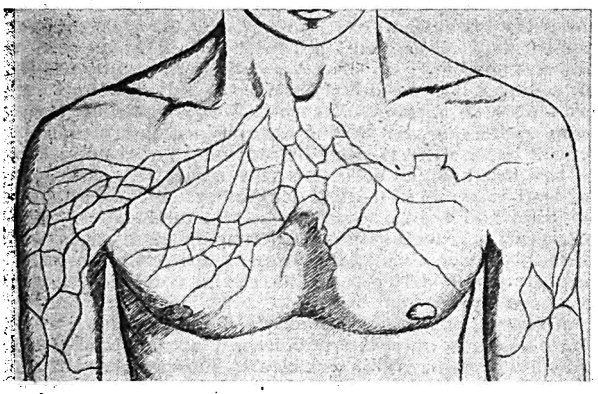

Fig. 2—Case 2. Tracing of infrared photograph taken with shoulders at rest.

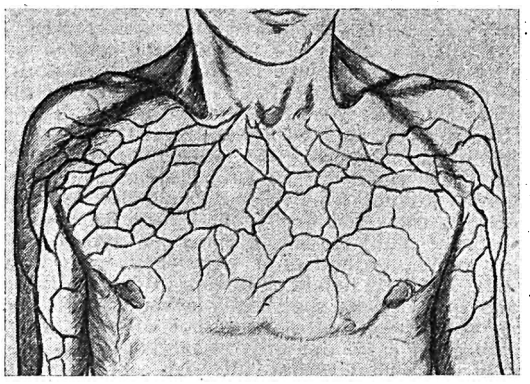

Fig. 3—Case 2. Tracing of infrared photograph with shoulders braced backwards and downwards, showing distension of superficial arm and pectoral veins on the right side.

be surrounded by a thickened fibrous sheath in the region of the tip of the cervical rib and neck of the first thoracic rib; here it rested on a dense layer of fascia passing downwards from the cervical rib. The anterior portion of the cervical rib was then excised, relieving the pressure on the lower trunk of the brachial plexus. Finally the lower trunk of the plexus was dissected out of its thickened adventitial sheath. After freeing it appeared normal.

The postoperative result was satisfactory. There was immediate subjective and objective improvement in the power and dexterity of the left hand and a diminution of the sensory changes. Three weeks later electromyography showed normal motor unit activity in most of the intrinsic hand muscles in addition to fibrillation and the reappearance of a few motor unit action potentials in the opponens and abductor pollicis muscles. After heating there was now hypohidrosis only over the tip of the left little finger, while the sensory disturbance had disappeared. However, on backward and downward bracing of the shoulders the pulsations of the brachial and radial arteries of the left arm still disappeared, and venous congestion in the pectoral region again became apparent; but hyperextension of the neck no longer affected the arterial pulses. It had been observed at operation that there were two points at which the subclavian artery was being compressed—between the scalenus anterior and the apex of the cervical rib, and between the clavicle and first thoracic rib. Since an adequate cause of the dominating neurological features had been found and dealt with by removal of the tip of the cervical rib, this lower interspace was nor disturbed, especially as there were no symptoms attributable to compression at this point. The fact that after operation the arterial pulses still disappeared on backward bracing of the shoulders but not on hyperextension of the neck shows that the scalenus anterior muscle, which had been divided, played no part in the first manœuvre though it did in the second.

Comments.—The neurological features observed were due to compression of the lower trunk of the brachial plexus against the tip of a small cervical rib. Contractions of the scalenus anterior muscle played a part in maintaining this compression. The left subclavian artery was being compressed intermittently at two places—between the scalenus anterior and the tip of the cervical rib, and between the clavicle and first thoracic rib. After division of the scalenus anterior muscle, compression of the left subclavian artery and vein between the clavicle and first thoracic rib persisted on backward and downward bracing of the shoulders but not on hyperextension of the neck. On the right side there were no vascular disturbances. Oscillometry indicated only a partial obstruction of the subclavian artery on backward and downward bracing of the shoulders on this side. The asymmetry of the thoracic inlet would account for the greater compression of the left subclavian artery.

CASE 4

A man, aged 28, who showed only neurological abnormalities, was admitted to a military hospital on Dec. 15, 1942 with 17 weeks history of paræsthesiæ and numbness of the ulnar 1½ fingers of the left hand, with weakness and wasting of all the intrinsic muscles including the thenar muscles. There was a zone of diminished cutaneous sensibility over segmental areas C8 and T1, greater to pinprick than to cotton-wool, suggesting a nerve root as opposed to a peripheral nerve lesion (Weddell 1941). Sweating tests showed a slight delay in secretion in response to heating along the ulnar border of the left forearm and hand. Electromyography showed fibrillation action potentials and diminished motor unit activity in all the intrinsic hand muscles, indicating slight lower motor neurone denervation. All muscles responded normally to faradism. No diminution in the pulsations of the brachial or radial arteries was observed in the arms on either hyperextension of the neck or backward and downward bracing of the shoulders. X rays of the neck showed enlarged transverse processes on the 7th cervical vertebra but no cervical ribs; the thoracic inlet was symmetrical. The case therefore appeared to be one of "scalenus anticus syndrome" with neurological changes from involvement of the lower trunk of the brachial plexus.

At operation on Jan. 12, 1943, through an exposure similar to that employed in cases 1 and 3, the only abnormal finding was a taut tendinous band about 6 mm. wide by 1 mm. thick, probably representing the scalenus minimus of Albinus (Jones 1911), which passed downwards from the transverse process of the 7th cervical vertebra to be inserted into the inner border of the first rib between the subclavian artery and the first thoracic nerve root. It compressed the lower trunk of the plexus against the neck of the first rib. It was divided and a groove was noted in the nerve trunk at the point of compression. On passive hyperextension of the neck the scalenus anterior muscle, which was left intact, did not compress either the subclavian artery or the lower cord of the brachial plexus. The interval between the clavicle and the first rib at the level of the subclavian artery was not less than 1·8 cm. after the shoulders had been pushed firmly backwards and downwards.

After the operation the muscle weakness and sensory changes immediately disappeared as far as could be determined clinically. In addition, the muscle wasting rapidly disappeared and within a month was no longer perceptible. Electromyography now showed vigorous motor unit activity; but the fibrillation action potentials were still present and the slight disturbance of sweat secretion noted before operation had not yet disappeared.

Comments.—The neurological signs observed in this case were due to compression of the lower trunk of the brachial plexus against the first rib by a tendinous band, division of which was followed by clinical cure. They were not due to any action of the scalenus anterior muscle, which was not divided at operation. There were no signs suggesting compression of the subclavian artery and vein, and at operation there was not sufficient approximation of the clavicle to the first rib on manipulation of the shoulder to cause compression of the subclavian vessels.

TESTS IN NORMAL SUBJECTS

The four cases demonstrate the value of testing the effects of postural manœuvres of the shoulder girdle on the arterial pulsations of the limb as a diagnostic measure when costoclavicular compression of the subclavian vessels is suspected. To assess the frequency with which the subclavian artery can be compressed in normal subjects we performed these postural manœuvres in 50 men and 50 women aged 19–47 years, chosen at

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random from the staff and convalescent patients of a military hospital. Table II summarises the main findings. The radial pulse was affected on one or both sides by these manœuvres in 25 of the men and 30 of the women, being obliterated in 18 and 19 respectively. The condition was bilateral in 62 subjects. The pulses were more often affected by backward and downward bracing of the shoulders (54 subjects) than by hyperextension of the neck (20 subjects), and in only one instance (a woman) were the pulses affected by the latter manœuvre when the former had been without effect. Few of the subjects complained of symptoms, but several women volunteered that they were liable to chilblains on their hands or fingers in cold weather, and so each subject was specifically asked about this. Of 45 persons whose pulses were not affected, only one complained of chilblains on the hands; 14 women and one man who suffered from chilblains on both hands had some bilateral alteration of the pulses. Moreover, of 11

TABLE II—EFFECT OF FORCED POSTURES ON THE RADIAL PULSES OF NORMAL PERSONS

—	On backward and downward bracing of shoulders	On hyperextension of neck	On either manœuvre	Subject to chilblains on hands
50 men				
No effect on pulses	25	41	25	1
One or both radial pulses diminished only	7	1	7	0
One or both radial pulses obliterated	18	8	18	1
50 women				
No effect on pulses	21	39	20	0
One or both radial pulses diminished only	11	7	11	2
One or both radial pulses obliterated	18	4	19	12

women in whom the pulse was involved on one side, 3 who complained of chilblains had them on the affected side only. These observations suggest that costoclavicular compression may be one of the predisposing causes of chilblains in the hands, but it obviously cannot be the basic cause because it does not explain chilblains in other parts of the body. Other symptoms, short of obliterative arterial disease, which may be shown in mild cases are transient numbness and tinglings in the hands and fingers while the arm is actually in the position which compresses the artery. This may be occasioned by carrying heavy weights, or in the Services by marching with full pack.

DISCUSSION

Eden (1939) has surveyed the chief theories concerning the origin of vascular complications of cervical ribs and first thoracic rib abnormalities. He described three cases (including one reported by Lewis and Pickering in 1934) with obliterative arterial disease affecting the distal arteries of the limb, in which it was shown at operation that the subclavian artery was being compressed between the clavicle and first rib when the arm was abducted. In addition he tabulated 45 published cases of cervical rib or first thoracic rib abnormalities with vascular complications; from an analysis of these he suggested that the vascular disturbances resulted from direct injury to the subclavian artery. Eden then elaborated the hypothesis, first advanced by Lewis and Pickering (1934) that at the point of trauma an intimal thrombus may form in the damaged artery, and that the phenomena of obliterative arterial disease, such as "Raynaud attacks" in the fingers, obliteration of one of the distal or main arteries of the limb, and ultimate gangrene, are the result of emboli dislodged into the blood-stream from this mural thrombus. Eden advocated that enough of the offending rib should be removed to allow the artery to pass freely beneath the clavicle without compression, and pointed out that division of the scalenus anterior muscle alone is often insufficient to prevent further trauma.

The vascular changes in our 3 cases were less severe than in those reported by Eden; only in case 1 was there evidence of obliterative vascular changes. In this case the skin temperature of the left hand was considerably lower than on the right side, and the difference persisted after heating, indicating that vasospasm was not responsible. In cases 2 and 3 there was no evidence of obliterative vascular changes resulting from intermittent compression. In case 3 the vascular changes were overshadowed by the neurological features, but in case 2 there were periods of numbness and paræsthesiæ in the hand which were directly referable to the intermittent compression of the main artery. If this compression had been allowed to persist unchecked, signs of obliterative arterial disease increasing in severity would probably have eventually appeared in this case. The importance of early recognition of this condition therefore becomes apparent.

Approximation of the clavicle to the first rib can compress not only the subclavian artery but also the subclavian vein. This was clearly shown in cases 2 and 3 when backward bracing of the shoulders for one minute led to distension of the superficial veins of the limb with the opening up of collateral venous channels across the pectoral region to the deep veins of the neck. This phenomenon was not looked for in case 1. It has been previously recorded by Adson and Coffey (1927) in a case of cervical rib showing vascular changes and was considered by them to be due to sympathetic dysfunction.

More than one postural manœuvre involving the shoulder girdle may result in compression of the subclavian vessels. The movement which does this most constantly is backward and downward bracing of the shoulders, but hyperextension of the neck, as described by Adson and Coffey (1927) will also do it in a proportion of cases. Backward and downward bracing of the shoulders is the motion which most directly approximates the clavicle to the first rib (fig. 4). Hyperextension of the neck probably also narrows the angle between the first rib and the clavicle. In this manœuvre the scalene muscle may play a part as an elevator of the anterior end of the first rib. In 62% of the normal persons examined by us costoclavicular compression of the subclavian vessels was a bilateral phenomenon. However, in cases of cervical ribs or first thoracic rib abnormalities with vascular symptoms which have been described, symptoms and signs seem to be more pronounced on one side. This may be due (as was clearly shown in cases 1 and 3) to asymmetry of the thoracic inlet leading to a narrower interspace between clavicle and first rib on one side than on the other. It is interesting to note that in case 2 a previous fracture had altered the contours of the left clavicle, increasing the interspace on that side.

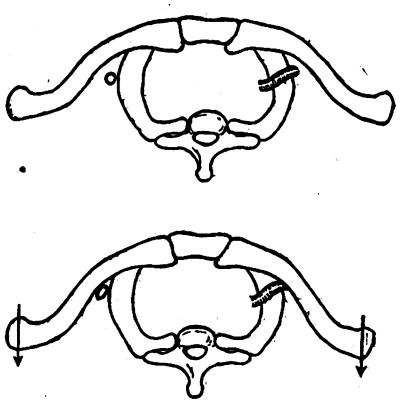

Fig 4.—Diagrams illustrating mechanism of costoclavicular compression of subclavian artery on backward and downward bracing of shoulders.

Symptoms of obliterative arterial disease due to cervical rib or first thoracic rib abnormalities are rare. Eden in 1939 collected only 48 published cases. But our experience in the Services suggests that mild vascular symptoms referable to these rib abnormalities are more frequent than has been suspected. (We have seen 6 cases with mild vascular symptoms in 8 months.) Two factors probably account for this. Most persons in the Services are subject to greater physical stress involving their shoulders than in civil life, and they also report to their medical officers when symptoms first appear, long before the stage of obliterative arterial disease (case 2).

Among the older hypotheses concerning the mechanism of the vascular changes in the arm which were discussed by Eden were those of Murphy (1905), Todd (1913), Leriche (1935), Telford and Stopford (1931), and Blair, Davies and McKissock (1935). Murphy held that the

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subclavian artery was compressed between the scalenus anterior muscle and the rib, while the others believed that nervous factors were responsible for the vascular changes through sympathetic nerve dysfunction. Eden brought forward evidence against the concepts of sympathetic irritation, but did not refer to the many recent elaborations of Murphy's view that the artery might be compressed between the scalenus anterior muscle and the rib, or that the scalenus anterior itself plays a major part in the production of symptoms. Advocates of the "scalenus anticus syndrome" associated with either cervical rib or first thoracic rib abnormalities (Adson and Coffey 1927, Ochsner, Gage and DeBakey 1935, Naffziger and Grant 1938; and many others) recognise two main groups of cases—those in which vascular disturbances are prominent and a larger group in which neurological features predominate. For both groups division of the scalenus anterior muscle is recommended. Undoubtedly in some cases division of this muscle is followed by improvement or recovery, but this is not true of all cases which come under this diagnosis. Thus in our first 3 cases the vascular phenomena persisted even after the scalenus anterior had been divided, or paralysed by local anæsthesia. A striking instance was Eden's third case, in which two operations had to be carried out. At the first operation the scalenus anterior was divided without benefit; at the second a portion of the first rib was removed with consequent improvement in symptoms. Case 4 shows that the scalenus anterior is not always responsible for the neurological abnormalities, but that other factors such as compression of nerve trunks by bands are the cause.

In addition to the observation that division of the scalenus anterior sometimes fails to relieve symptoms, there are two other features found in many cases with vascular symptoms which cannot be satisfactorily explained on the basis of a "scalenus anticus syndrome." At operation the subclavian artery is usually found to be pulsating vigorously where it lies on the rib lateral to the scalenus anterior. Most authorities have attempted to explain this by modifications of Todd's theory, that sympathetic irritation results from pressure of the rib on the lower trunk of the brachial plexus and gives rise to peripheral vasospasm. Objections to these hypotheses have been put forward by Eden (1939). The third feature, which hitherto has been difficult to explain, is that many cases of aneurysm or aneurysmal dilatation of the third part of the subclavian artery have now been described in relation to cervical ribs. Such authorities as Halsted (1916) and Matas (1935) have laboured hard to explain their occurrence distal to the presumed point of obstruction of the artery behind the scalenus anterior. All these hypotheses, however, lose their importance if it is accepted that the point of obstruction is between the clavicle and first thoracic rib distal to the third part of the subclavian artery.

Without the postural manœuvres described, the intermittent arterial obstruction in our cases would have passed unnoticed. It is therefore recommended that they be employed in all cases of obscure vascular disturbance in the upper limbs. It must be remembered that these movements obliterate the pulses in a considerable proportion of normal people (see table II). A positive result should therefore only be considered significant when other causes of vascular disturbance have been excluded. The presence or absence of scalenus anterior spasm can be confirmed by repeating the tests after paralysing the muscle with a local anæsthetic. Valuable additional tests are afforded by oscillometry and skin temperature determinations.

The treatment of costoclavicular compression of the subclavian vessels depends on the severity of the vascular disorders. In cases of "scalenus anticus syndrome" where the symptoms are mild (as in our case 2), Naffziger and Grant (1938) recommended exercises designed to strengthen the shoulder girdle and so lessen the gravitational drag of the upper limb on the trunk. They reported that improvement in posture is often followed by benefit and even complete relief. It is difficult to conceive how these exercises can relieve a scalenus anterior compression, but since they may relieve a costoclavicular compression it is more probable that it was the latter mechanism which operated in their successful cases. Following Naffziger and Grant's results we recommend remedial exercises in cases with mild vascular symptoms; in cases with neurological disturbances early exploration is essential if complete recovery is to be obtained (see case 4). Surgical treatment is indicated whenever features of obliterative arterial disease are present. The operation should primarily be exploratory, for the site of the compression of the subclavian artery must first be ascertained. This part of the operation is preferably done under local anæsthesia. If the artery pulsates vigorously lateral to the scalenus anterior muscle, especially while the muscle is contracting during faradic stimulation, it should be observed whether the tip of the forefinger is nipped in the interspace between rib and clavicle when the shoulder is braced backwards or downwards. If a compression is demonstrated at this level only, the essential part of the operative procedure should be the removal of a segment of the rib from beneath the artery. During this stage of the operation intravenous or inhalation anæsthesia can be given. It is preferable to remove the periosteum so as to prevent regeneration of the rib, but technically this may be difficult and incurs the risk of penumothorax. Division of the scalenus anterior alone may be insufficient to relieve the compression, as was shown in our first and third cases and in Eden's third case.

SUMMARY

Three cases of vascular disturbance in the upper limb due to compression of the subclavian artery and vein between clavicle and first thoracic rib are described. In one of these in which cervical ribs were demonstrated the subclavian artery was being compressed at two places—between the scalenus anterior muscle and the apex of the cervical rib; and between the clavicle and first rib. In a fourth case, which showed neurological disturbances only, the subclavian vessels were not compressed, and relief was obtained by section of a fibrous band compressing C8 and T1 nerve-roots without division of the scalenus anterior.

Costoclavicular compression of the subclavian vessels can be recognised by observing the effect of postural manœuvres of the shoulder girdle on the arterial pulses of the limb. Backward and downward bracing of the shoulders is the movement which obliterates the pulses most readily.

The subclavian vessels can be compressed by these forced manœuvres in many normal subjects. Symptoms arise only when this compression is easily provoked, and if the compression is not relieved at an early stage features of obliterative arterial disease may supervene. Symptoms range from cold blue hands with a tendency to chilblains in the mildest group of cases to "Raynaud attacks," arterial thromboses and even gangrene in the more severe cases.

In the past these cases have been confused with those of the "scalenus anticus syndrome." They may be differentiated by paralysing the scalenus anterior muscle with a local anæsthetic.

In milder cases benefit may be obtained by remedial exercises designed to increase the postural tone in the muscles of the shoulder girdle. In more severe cases operation is required and is best begun under local anæsthesia. The site of compression of the subclavian artery between clavicle and first rib is demonstrated by getting the patient to brace his shoulders backwards and downwards. In positive cases the tip of the forefinger is nipped between the clavicle and the rib and the radial pulse disappears. When a compression at this level is present, the essential part of the operation is removal of a segment of the offending rib from beneath the artery, for division of the scalenus anterior muscle alone may be ineffective.

We are indebted to Lieut.-Colonel G. O. Chambers, RAMC, our commanding officer, for permission to publish this paper; to Brigadier Hugh Cairns and Air-Commodore C. P. Symonds for advice and criticism during the course of the investigations; to Major C. A. Calvert, RAMC, for referring case 3 to us for operation; and to Miss Jill Platts for the illustrations.

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CHRONIC FLEXNER DYSENTERY TREATED WITH SUCCINYLSULPHATHIAZOLE

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SEVERAL reports from this country and America have established sulphaguanidine as a potent remedy in the bacillary dysenteries. Its value in surgical diseases of the gastro-intestinal tract is limited owing to the drug being "too readily absorbed . . . giving rise to frequent and severe reactions," and being "ineffectual in the presence of ulcerating lesions of the bowel." Poth and others[1] investigated a number of sulphonamide compounds with the object of finding one which overcame these limitations. Succinylsulphathiazole ('Sulphasuxidine') was eventually chosen because its absorption was slight (about 5% excreted by the kidneys), severe toxic reactions were not encountered, and it drastically reduced the number of coliform bacilli in the stools (in some instances to zero).[2] The few papers available indicate that the new compound is as efficient as sulphaguanidine in the treatment of Shiga, Flexner and Sonne dysenteries. if not more so. Its mode of action is as yet unexplained, although it may depend on the liberation of free sulphathiazole, inhibited from absorption by the succinyl radical. Poth's suggestion that it leads to "a high local concentration of . . . nascent sulphathiazole in intimate contact with the organism" is purely speculative.

In the case described below, the dosage of the drug was approximately that recommended[3 4]—namely, 0·25 g. per kg. body-weight a day.

A female chronic schizophrenic, aged 36, who enjoyed indifferent health, developed pyrexia with frequent relaxed slimy stools on Nov. 10, 1941. No blood was passed. The acute symptoms lasted for a few days and gradually subsided. On Dec. 12 a report on the stools was positive for Flexner's dysentery. There was a recurrence of diarrhœa without pyrexia in February and March, 1942, and on repeated examination of the stools some of them still showed Flexner's bacilli. A course of sulphaguanidine was began on March 25, 1942, the initial dosage being 9 g. a day. Because of occasional diarrhœa persisting during the therapy, the drug was continued for a month, 126 g. being administered in all. For the next 3 months the diarrhœa was considerably checked, but the patient continued to excrete the bacillus off and on. A second course of sulphaguanidine was begun on July 5, 1942, 60 g. being administered in 7 days. Intermittent diarrhœa persisted and the organism continued to be excreted. Further 7-day courses of sulphaguanidine were administered, beginning on Aug. 15, 1942 (46 g.) and on March 6, 1943 (50 g.), but they were ineffective. On April 27 a 7-day course of succinylsulphathiazole was begun, 9 g. being given each day, divided into three equal doses. The patient's diarrhœa then ceased, her general condition notably improved and the stools have been consistently negative for Flexner since.

This was a striking result. Here was a chronic dysenteric, who had diarrhœa and positive stools on and off for nearly 18 months before sulphasuxidine therapy was instituted. Sulphaguanidine had been tried on four separate occasions without success. Yet after a single course of succinylsulphathiazole her symptoms cleared and the stools became negative for the dysentery bacillus. As far as we are aware, no similar case has yet been reported, although Kirby and Rantz[5] report success in the treatment of 5 dysentery carriers; unfortunately they give no details of these in their paper.

1. Poth, E. J., Knotts, F. L., Lee, J. T. and Inui, F. *Arch. Surg. Chicago*, 1942, 44, 187.
2. Poth, E. J. and Knotts, F. L. *Ibid*, p. 208. Poth, E. J. *J. Amer. med. Ass.* 1942, 120, 265. Streicher, M. H. *Med. Clin. N. Amer.* 1943, 27, 189.
3. Poth, E. J., Chenoweth, B. M. and Knotts, F. L. *J. Lab. clin. med.* 1942, 28, 162. Firor, W. M. *Ann. Surg.* 1942, 115, 829.
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Reviews of Books

A Pocket Surgery

PHILIP H. MITCHINER, MD, MS LOND., FRCS, major-general (TA) DDMS Command; surgeon to St. Thomas's Hospital; A. HEDLEY WHYTE, MS DURH., FRCS, surgeon to Royal Victoria Infirmary, Newcastle-on-Tyne; brigadier (TA) consulting surgeon, Northern Command. (Churchill. Pp. 272. 10*s.* 6*d.*)

WRITING for Service medical officers, the authors have compressed many useful facts into this small manual of surgery. Thoughtful selection and terse phrasing have enabled them to cover a wide field, important and everyday conditions (such as acute abdominal disease and swellings of the scrotum) being fully and clearly dealt with, while less common problems are outlined in a few apt words. Naturally such brevity occasionally misinforms: they cannot surely believe that nuclear prolapse is so often the cause of sciatica as their text seems to indicate, nor that spontaneous rupture of a pelvic abscess is preferable to its treatment by timely incision, either through the abdomen or via the rectum. Nor do they explain why they think early diagnosis of pregnancy is unnecessary and that the Aschheim-Zondek test need never be done under existing conditions; service officers find the former necessary and difficult, and the latter remarkably useful. They rightly advise against medical students using this volume as a "cram book," but service medical officers would do well to carry it about with them. It will be specially welcome to those who find the surgeon's knife in their hands either for the first time or after long abstinence.

Social Service in the Clinic for Venereal Diseases

(2nd ed.) DOROTHY MANCHÉE. (Baillière. Pp. 117. 5*s.*)

THE second edition of Miss Manchée's book follows the lines adopted in the original edition, but is brought up to date by a detailed description of Regulation 33B and reference to the Adoption of Children (Regulation) Act which came into force as recently as last June. Other information in the appendix includes the location and hours of treatment centres, and the addresses of agencies and organisations to which application may be made for the various forms of assistance which the venereal patient may require to facilitate continued attendance at the clinic. The book will prove useful to those who are interested in social service in general, and may assist the young almoner to decide to specialise in the varied duties which may fall to her lot if appointed almoner to a VD clinic. That these duties differ considerably from those of the almoner of a general hospital is made clear, and the human interest of her work is emphasised as well as the patience, perseverance and tact it calls for. It is to be hoped that this little book may encourage the appointment of almoners in all the larger VD centres, and help to bring forward for training sufficient women suited to the task.

Medical Practice

British Encyclopædia of Surveys and Abstracts 1942–43; Cumulative Supplement. Editor: Sir HUMPHRY ROLLESTON, Bt., MD CAMB., FROP. (Butterworth. Pp. 342, 382. 35*s.*)

THE new volume of the encyclopædia and its cumulative supplement reflect their usual credit on editor and publishers. The critical surveys by seventeen distinguished contributors summarise the year's advances in a wide medical and surgical field; and the abstracts of current published work are able and informative. The supplement, which replaces its predecessors, brings up to date the accounts of disease set out in earlier volumes. Together they are one answer to the busy practitioner's query "How am I to keep my knowledge of medicine up to date?"

5. Kirby, W. M. M., Rantz, L. A. *J. Amer. med. Ass.* 1942, 119, 615.

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THE LANCET

LONDON: SATURDAY, OCTOBER 30, 1943

OUTPATIENTS FIRST

THE last twenty years have seen a steadily increasing demand by the public for those elaborate methods of investigation and treatment that cannot be economically supplied outside large hospitals. In consequence hospital authorities in many districts have been faced with lengthening lists of patients awaiting admission. To meet this situation many voluntary hospitals have built new wards, or enlarged old ones, and many municipal authorities have increased and improved the accommodation previously provided in the buildings of the old workhouse infirmaries. These measures were expensive and also involved increase of kitchen, heating and other domestic facilities, and quarters for the additional nursing and administrative staff required. Yet when the extensions were finished, there was no great or lasting reduction of the waiting-lists; for the patients were mostly seeking specialised service, particularly from the pathological or radiological departments, and these had seldom been enlarged. The bottleneck was in the special departments, and often enough the new beds were occupied by patients merely waiting for diagnosis.

There are many indications that the demand for specialist investigation in hospital will rise after the war. At the least, some extension of the National Health Insurance may be expected, and its benefits are likely to include consultant service. In such circumstances it will not be easy for the family doctor to refuse a note of reference to a hospital if the patient wants it, even though he may think it unnecessary. The public is well aware of the uses of radiography in the diagnosis of dyspepsia and pulmonary disease. A growing proportion of the profession have been trained in places where special tests are readily available, and later tend to rely on them greatly—some say excessively. Again, the reports of the professional defence societies and the newspaper publicity given to errors in diagnosis emphasise the need for special investigations, and the risks of omitting them.

In planning for the future these tendencies and the lessons of the past need to be borne in mind. It is uneconomical to admit a patient to the general wards of a hospital if he requires no more than board and lodging while investigations are made. Hitherto this has been done simply because there was no alternative, but it means that routine duties connected with the admission, feeding and discharge of minor cases distract the attention of the nursing staff from the care of the acutely sick. Even when these cases are dealt with as outpatients it often happens that the routine work of the main departments is held up by unexpected arrivals, who have to wait their turn in lobbies improvised in the corridors and landings of the hospital. The position is likely to become still worse if the old mistakes are repeated in hospitals built on the outskirts of large towns, or as centres to serve large areas. More patients may then travel longish distances and need to remain overnight. If the general wards are the only place available for them these wards will be further congested.

The right solution seems to be the provision of outpatient blocks at all large hospitals. Compared with existing outpatient departments, they should be far more fully equipped in technical apparatus, staff and accommodation for patients. Besides the standard waiting-rooms, consulting-rooms, and theatres for minor operations, there should be a branch of the main pathological laboratory of the hospital, capable of dealing on the spot—and in quantity—with such routine tests as blood-counts, blood-sugar estimations, simple staining, and the preparation of cultures and specimens; for there will surely be large follow-up clinics for diabetes and blood diseases at least. Similarly there should be an outpatient X-ray department, staffed by technicians and capable of taking routine films to be interpreted by the specialists. A secretarial staff, to deal immediately with letters to the patients' doctors, while the particulars of the case are still fresh in the consultant's mind, is an ideal that many have dreamed of, but few enjoy. For those patients who have to stay a few hours, there should be comfortable waiting-rooms, and a buffet where cheap meals can be had. Finally there should be a hostel for those who must be detained for a night or two but who do not need special nursing; this should have single bedrooms, or small wards, with central dining and recreation rooms. Such procedures as radiography of barium meals, pyelography, and surface application of radium could be carried out on patients resident in such a hostel. Again, those who have had minor operations could be kept for the night, and relatives of the dangerously ill, or of young children, could also stay there if they came from a distance. After these tests were finished, or the short postoperative period passed, the patients could again see their original outpatient consultant before returning to their homes. Only a small minority would have to be admitted to the main wards of the hospital. The members of the staff in charge of outpatients would have the satisfaction of dealing personally with the great majority of the cases sent them; they would no longer have to transfer them to the beds of their senior colleagues in charge of the main hospital wards. The outpatient block would require only a comparatively small nursing staff to deal with tests and dressings, for the administrative work of seeing that patients keep their appointments, and of guiding them to the special departments, could be perfectly well dealt with by a lay staff. The health propaganda service for the region would find such a centre a profitable field for its endeavours; it would give them a chance to strike while the iron was hot. A representative of the hospital almoner's department, or citizen's advice bureau, should be provided with an office in the building.

In a hospital with an enlarged outpatient department of this kind the turnover of patients would be much increased and their overhead cost correspondingly reduced. The public would receive a quicker and a far more convenient service than has hitherto been rendered by most institutions. The provision of convalescent homes and rehabilitation centres, so

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that the patients' stay in the general wards is reduced to a minimum, is a complementary solution—though that is another story. Hospitals faced with a long or growing waiting-list, and those planning for the future, will do well, we believe, to consider carefully whether they cannot meet the needs of the public in one or both of these ways more economically than by providing additional beds.

PROGRESS WITH PENICILLIN

THE American report[1] on 500 cases treated with penicillin under the direction of a committee of the National Research Council brings out the drug's potentialities in a variety of infections, particularly those that seemed most likely to arise among the armed forces or were resistant to sulphonamides. These included generalised and localised staphylococcal infection, pyogenic meningitis and empyema, pneumococcal pneumonia, sulphonamide-resistant gonorrhœa, and subacute bacterial endocarditis. The purified drug, standardised to the Oxford unit, was given intravenously, intramuscularly or locally, cases of empyema and meningitis being treated by injections into the pleural cavity or spinal canal. For the intravenous route, injections containing not more than 1000 units per c.cm., or a continuous drip of penicillin dissolved in saline or 5% glucose, were used at the rate of 5000–10,000 units per hour. For intramuscular injections, given every 2–3 hours, a concentrated solution of penicillin, usually equivalent to 5000 units per c.cm., was used. Adequate or optimum dosage has not yet been clearly defined, and seems to vary considerably with different patients and different infections. The objective must be to maintain a concentration in the blood sufficient to inhibit the growth of the infecting organism. Repeated estimation of the bacteriostatic power of the patient's serum against either the particular infecting organism or a standard culture of staphylococcus or streptococcus can best be made by FLEMING's[2] slide-cell technique, which is not difficult to master and requires only minimal amounts of blood such as can be obtained by finger or ear puncture. Adequate dosage may also be assessed by the patient's clinical response, and here change in the constitutional symptoms is at least as important as improvement in the temperature and pulse. It was found that in the normal person penicillin given intravenously or intramuscularly does not reach the spinal fluid; so, as FLEMING discovered, the drug must be given both intrathecally and intramuscularly for the effective treatment of meningitis.

At first sight the results in the American series are disappointing. Of 91 patients with staphylococcal bacteræmia, 34 died and 3 showed no improvement. This 40% failure in generalised staphylococcal infection is partly explained by inadequate dosage in cases treated early in the series, and by the inclusion of 9 cases of staphylococcal endocarditis, 3 cases of bilateral suppurative pyelonephritis and 3 cases with extensive burns. It emphasises the need for early diagnosis with immediate and adequate treatment, which may mean a total dosage of half a million to a million units over 7–14 days. Among localised staphylococcal infections excellent results were obtained in osteomyelitis; exudate quickly dried up, sinuses healed and chronic lesions disappeared in a few weeks. Even more striking was the rapid improvement in 7 out of 9 cases of staphylococcal empyema after a few days' local injections totalling 40,000–50,000 units of penicillin. Of 23 patients with severe hæmolytic streptococcus infection that failed to respond to sulphonamides, 13 recovered or improved, 7 died and 3 were unaffected. The results in anaerobic and non-hæmolytic streptococcus infections were less satisfactory, while penicillin in doses ranging from 240,000 to 1,760,000 units failed with one possible exception to cure 17 cases of bacterial endocarditis. However, the committee hold out some hope from early and prolonged treatment of cases infected with the more susceptible strains of *Streptococcus viridans*. Pneumococcal pneumonia responded well, often to remarkably small doses (100,000 units or less), but only 7 of 23 cases of pneumococcal meningitis recovered; it is only fair to add that not all of these were treated intrathecally. The cure of 125 out of 129 cases of sulphonamide-resistant gonorrhœa within 9–48 hours by doses of 100,000–160,000 units needs no comment. Only 5 cases of meningococcal meningitis were treated, with 1 death. The report suggests a scheme of dosage for different infections and different routes, and advises continuance of treatment for a week after temperature is normal. Toxic reactions were rare: there were occasional chills and fever; urticaria occurred in 14 cases, and local thrombophlebitis after intravenous injection in 19 cases. This valuable report will, we hope, soon be followed by a similar record of the collective experience with penicillin among our own Service and civilian sick.

Meanwhile the search goes on for improved methods of production and for alternative bactericidal substances from other moulds or bacteria. CLIFTON,[3] for example, has adapted the principle of the generator process for making vinegar to the production of penicillin on an experimental scale. Active principles have been extracted from aspergillus,[4] from actinomyces[5] and from other moulds.[6] The use of the ester of penicillin[7] may obviate the need for frequent injections, while a possible synergism between penicillin and sulphonamides or even *p*-aminobenzoic acid[8] deserves further exploration. But production of penicillin still lags far behind demand, and despite ministerial reassurance it is difficult to escape an uneasy feeling that not everything possible is being done to expedite supplies.

TEACHING OF PREVENTIVE MEDICINE

THE interim report of the social and preventive medicine committee of the Royal College of Physicians, published this week, is of fundamental importance in the teaching of medicine. Here for the first time in this country are drawn together into a comprehensible pattern those many-coloured threads of sanitary science, public health and social medicine which no one person has hitherto been able to disentangle and weave into a whole.

1. *J. Amer. med. Ass.* Aug. 28, 1943, p. 1217.
2. Fleming, A. *Lancet*, Oct. 9, 1943, p. 434.
3. Clifton, C. E. *Science*, July 16, 1943, p. 69.
4. Bush, M. T. and Goth, A. *J. Pharmacol.* 1943, 78, 164.
5. Gardner, A. D. and Chain, E. *Brit. J. exp. Path.* 1942, 23, 123.
6. See Atkinson, M. *Med. J. Aust.* 1943, i, 359.
7. Meyer, K. F., Hobby, G. L. and Dawson, M. H. *Proc. Soc. exp. Biol. N.Y.* 1943, 53, 100.
8. Ungar, J. *Nature, Lond.* Aug. 28 1943, p. 245.

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The report deals with the teaching of social and preventive medicine to undergraduates and with the arrangements for that teaching inside the hospital: a sequel will cover its organisation outside. "Social Medicine," according to the committee, "is concerned with the social environment and with heredity in so far as they affect health and well-being. Preventive Medicine is more executive in outlook and comprises the design and direction of measures for the preservation of health and the prevention of disease." These definitions are not entirely satisfactory, since social medicine—though a vast subject in itself—is clearly but one aspect of preventive medicine. To immunise a child against diphtheria is preventive, not social, medicine; to remove bad housing conditions may be both; to pay allowances to persons with tuberculosis to induce earlier treatment is clearly social medicine but equally a part of preventive medicine. This obscurity, however, does not greatly matter, since the report makes no practical distinction between the two and couples them together except in the discussion of the comparatively new specialty of Social Medicine in its strict sense.

As is well known to individual teachers of these subjects, little has been done to put into effect the aspiration of the General Medical Council that the student should have his attention directed to the preventive aspects of disease. Even where progressive schools have tried to attain the object of the GMC by splitting up the course among the usual clinical teachers, little integration has been achieved and what was at least a single subject under the hand of one man has been shared out among persons some of whom are uninterested in these aspects, and consequently there are sometimes wide gaps in the student's knowledge. For this reason, among others, it is recommended that "every medical school should establish a Department of Social and Preventive Medicine, the size and scope of the department depending upon the facilities and personnel available." The organisation of such a department and the qualifications to be required of its head—admittedly a rare combination at present—are discussed in some detail. The report boldly sets out a curriculum in social and preventive medicine, to include the historical approach; the existing health services; epidemiology and vital statistics; maternity and infant welfare; school medical services; tuberculosis and venereal diseases; industrial medicine; health education and rehabilitation. This arrangement agrees with the general lines laid down by FITZ-GERALD [1] following his world survey in 1936–37. Perhaps the coffin is nailed down a little too closely on "sanitation." "The environmental services *as such* need not detain the student . . . the technical details of ventilation, smoke abatement, water supplies, sewage disposal and other objective health studies are matters for post-graduate instruction for the diploma in public health." True; but every doctor should know something, however little, more than the average layman of such matters as the sources of pollution of a water-supply, the disposal of excreta in a camp or dampness in houses. Much time might be saved in teaching these matters by instructional films, to which the report hardly alludes, were suitable films available.

1. FitzGerald, J. G. *J. Amer. med. Ass.* 1938, 110, 1321.

By far the most interesting part of the curriculum is the new ground broken by the proposed introduction, in the final stage, of instruction in the technique of social investigation and case-taking, linked up with the health centre, the almoner's department and the psychiatric social worker. By these or other methods, this had been achieved abroad before the war—as was shown by GOODMAN [2]—notably in the USA, at Nancy and in Brussels, and although the organisation is difficult, it is certainly possible. All this can, the committee think, be achieved without a great increase in the time allotted to the subject, except in the London schools, whose comparatively poor showing in this respect is well known.

The arrangements for social medicine inside the hospital depend upon the almoner's department, and useful information and advice is given on its organisation and extension, which should finally dispose of the idea that the almoner is a kind of unauthorised tax-gatherer, solely concerned with the collection of money. The teaching of social and preventive medicine to nurses and the use of psychiatric social workers is also discussed and the report ends with seven recommendations, which call for the establishment of a department of social and preventive medicine in every teaching school to organise a modernised course covering the three clinical years, including social medicine in the strict sense and industrial medicine; for the setting up of student health services, used as an instrument of teaching, and under the general direction of the department; for the employment of almoners and psychiatric social workers; and for the Royal College of Physicians to take an active part in the organisation of the teaching of this great subject to students, nurses and medical social workers.

This is the report long awaited by those who have felt that preventive medicine will never achieve its rightful place until a new generation of students, trained in its principles, pass on to provide teachers having the true "preventive outlook." By producing this document, and its companion on the teaching of psychological medicine which we summarise on p. 553, the College has indicated objectives and provided plans of attack. It is for the teaching schools to capture and consolidate the positions.

WAR AND THE DOCTOR

THERE are said to be only seven basic jokes, and sometimes it looks as though the same may be true of ideas. Certainly fundamental principles in medicine and surgery have recurred from time to time to the mind of man, attended by all the thunder of revelation; and advances have commonly been in methods of applying them rather than in the principles themselves. War-time advances in technique are commonly of this kind. Thus PARÉ'S belief in the gentle usage of wounds finds beautiful expression in modern plaster technique; and the "flying ambulances" devised for taking the wounded to the rear by Napoleon's surgeon, Larrey, have now achieved a literal interpretation. In the extracts from Prof. HUME'S Harveian oration which appear on another page, there are several enlightening examples of this kind. His hearers and his readers will alike be grateful for a review which brings back the past to illuminate the present.

2. Goodman, N. M. and Morris, C. *Proc. R. Soc. Med.* 1940, 33, 15.

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Annotations

INFECTION AND FŒTAL MORTALITY

OF late years increasing attention has been paid to neonatal infection. Not long ago in his Ingleby lectures, Prof. Charles McNeil discussed the work in Edinburgh on this subject, and indicated the way in which this cause of death in early life could be attacked mainly by prevention. Work in New York on fœtal mortality takes the prevention of infection a stage further back, so to speak, and is complementary to the studies of McNeil and his co-workers.

Douglas and Stander [1] have devoted their inquiries to infection during long labour. For some years they had been taking blood-cultures from the hearts of stillborn infants immediately after delivery; they were particularly interested in the effects of long labour, and it soon became obvious that most positive blood-cultures were found in infants who had experienced such labour—in which, moreover, there was definite clinical evidence from the maternal side of intrapartum infection. In taking the blood-culture from the infant the skin over the precordium is prepared with iodine and alcohol. A sterile needle attached to a 5 c.cm. syringe is then inserted directly into the heart, and the blood or plasma thus obtained is inoculated into different media and incubated under both aerobic and anaerobic conditions. In one group of 85 infants thus investigated there had been no obvious cause of death. A positive blood-culture was obtained in all, and though in 11 of them other possible causes of death were discovered, it was felt that even in these the bacteræmia may have played a part. The organism most commonly found was an anaerobic streptococcus including facultative strains. Investigations of the blood were also made in babies dying after labours in which there was an obvious cause of death such as intracranial hæmorrhage, congenital abnormality or asphyxia. A total of 140 such babies yielded negative blood-cultures.

In the 85 infants with positive blood-cultures, most of whom showed no cause of death apart from the bacteræmia, the fœtal heart stopped before the onset of labour in 16, during delivery in 20, and during labour but before the actual delivery in 47. The usual autopsy findings in this stillbirth bacteræmia group included maceration, petechial hæmorrhages, and in a few there was pneumonia. Examination of the placenta showed inflammation in 44 (out of the 85), and maceration in 10; it was classified as completely normal only in 15. It is suggested that during long labour organisms present in the vagina became invasive and pathogenic, reaching the fœtus eventually through the placenta. Another probable route is by aspiration of infected liquor. Towards the end of the investigation an attempt was made to use the sulphonamide group of drugs to control maternal infection and thus fœtal infection in long labour. Encouraging results were obtained when the drug was given at an early stage before the development of fever and vaginal discharge. It was also found, from an analysis of the results, that operative procedures aimed at speeding up delivery in long labour gave poor results for mother and child. Spontaneous delivery is better.

These findings are of great interest in relation to some of the mysterious cases of stillbirth. Hitherto it has been accepted that infections reaching the infant through the placenta are limited to syphilis and in rare instances tuberculosis. The fact that bacteræmia and on pathological evidence septicæmia in the fœtus may result from intrapartum maternal infection indicates lines on which prophylaxis may develop.

1. Douglas, R. G. and Stander, H. J. *Amer. J. Obstet. Gynec.* 1943, 46, 1.

THE CHANCE FOR GENERAL PRACTICE

"CHANGE and decay in all around I see" is the natural response of the pessimist to any modification of his environment. In the presidential address last week to the section of epidemiology and state medicine of the Royal Society of Medicine, Sir Weldon Dalrymple-Champneys, whom none could call a pessimist, implied that change is not irrevocably wedded to decay: sometimes it is a sign of growth—though of course it may be hard for the contemporary observer to guess which he is looking at. He reminded his hearers of the misgivings among doctors in 1911 about the National Health Insurance Act. Yet now, he said, the system is so firmly established in their affections that a large section of the profession seems to think its extension the best way of providing a comprehensive medical service. As a result of the state care of children and expectant and nursing mothers, supervision of the family is split up—unfortunately he feels; and he believes that the ideal is continuous medical supervision of the individual by the same person. The mistrust shown in 1911, and the failure of the family doctor to take a fuller part in the health services provided by the state, he attributes largely to the failure of medical education to keep pace with the swing towards preventive medicine. He neatly compared the airman who spies the enemy afar off, and the radiolocator who spots him long before he comes into sight, with the medical student, his contemporary, growing skilful in the discovery of the first glimmerings of ill health.

In the past medicine has often fallen into decay, the wisdom of a civilisation often being lost for centuries. It is not impossible that this might happen again: it nearly happened in Germany in 1940, said Sir Weldon, under the tyranny of Nazi ideas. Decadence usually coincides with over-specialisation on insufficient knowledge, and the only sure defence against over-specialisation, he holds, is to give the general practitioner a dominant share in the care of the patient, and to fit him for the task. That the general practitioner should "turn a blind eye to the opening stable door, waiting until the horse is loose to start chasing it" is not only contrary to the traditions of the profession but contrary to common sense. He was not suggesting that the family doctor should be an expert on environmental hygiene, though he should understand its principles; or an epidemiologist, though he should be familiar with the ways in which infectious diseases are transmitted; but he ought to know three things: his patient's heredity and environment including his circumstances at home and at work; his medical history and present condition; and the agents that can be invoked to restore him, whether methods of treatment or organisations. He believes that the general practitioner must be established surely as the guardian of the family, and his hand must be strengthened in every possible way by the weapons of modern science and state organisation: with this support he has a chance of occupying a key position in medicine and the state, to everybody's benefit.

TRYPTIC DIGESTION OF LIVING TISSUES

IT has always been a puzzle why the intestine does not digest itself with all the medley of enzymes which it secretes, and the failure of trypsin to attack bacteria is remarkable considering how much more easily it can digest mammalian tissues. For part of the puzzle Dragstedt [1] has now suggested a solution which has attractive points. It seems that one of the actions of trypsin on mammalian tissues is to liberate histamine from them, and it has been found that a subcutaneous injection of trypsin, too weak to bring about local tissue digestion, can be made to do so if histamine is injected at the same time. Dragstedt's

1. Dragstedt, L. R. *Science*, 1943, 98, 131.

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view is that trypsin first liberates histamine, and that this in turn so disorganises the local blood-supply that the cells lose their vitality and become digested. Bacteria are avascular and insensitive to histamine, and hence retain their vitality even in the presence of concentrations of trypsin that would be lethal for mammalian tissues.

As Dragstedt himself is careful to point out, this hypothesis does not explain why healthy living cells are not digested by trypsin, and the resistance of the intestinal mucosa must remain for the present one of the mysteries of physiology; but it does offer an explanation of the relative susceptibility of vascular tissues, and hence eliminates any necessity of postulating that bacterial protoplasm has developed special tryptic resistance.

THE MALTA EPIDEMIC OF POLIOMYELITIS

NOT long ago poliomyelitis was regarded as a droplet infection with the virus passing from the nasal mucosa via the olfactory nerves to the susceptible motor nerve-cells in brain and spinal cord. It was, however, found difficult to reconcile the autumn incidence of poliomyelitis with its being a respiratory infection. At last week's meeting of the neurology section of the Royal Society of Medicine Prof. S. P. Bedson reviewed present opinion about how the disease is conveyed. For many years Kling from epidemiological data, and Toomey from experimental evidence, have been strong advocates of an intestinal mode of spread. The failure of zinc sulphate sprayed into the nose to protect against infection in the Toronto epidemic, and the absence of lesions in the olfactory lobes of fatal cases, were points against the nasal entry of the virus. Recent American work has shown that the virus can be readily recovered from the fæces of clinical and abortive cases, and of intimate contacts, and also from sewage effluents of hospitals where there are infected children. A cynomolgus monkey, infected by spraying the virus into the mouth after the olfactory route was blocked, showed lesions severest in the ganglia of the 9th and 10th nerves whose branches supply the oropharynx. Tonsillectomy in children exposed to infection may be followed by the highly fatal bulbar form of the disease. This, and other evidence, indicate that the principal portals of entry of the virus are the oropharynx and the gastro-intestinal tract, and that the vehicle of spread is probably contaminated food, milk or water. A concomitant droplet spread is not ruled out, but the new knowledge must obviously mean a reorientation in our measures for controlling the infection.

Later in the same discussion Prof. H. J. Seddon described, with many illustrative photographs and charts, an epidemic of poliomyelitis which occurred in Malta between November, 1941, and February, 1942, involving some 400 Maltese children and about 60 British and Dominion troops. In Malta the infection is endemic with only a few notified cases each year. The epidemic wave began at a time of great upheaval and distress in the island, when it was more or less isolated. It broke out first among the native children about Nov. 15 and gradually reached its height in mid-December. Over 90% of the clinical cases were in children under five years, with the peak in the second year and few cases under three months of age. Case-fatality among the children was 3·5% and among the affected troops 17%. Only 3 clinical cases were detected among adult Maltese. Of possible predisposing causes neither overcrowding nor malnutrition seemed to play an important part. Instances of case-to-case infection were rare. A possible significant factor was the use of untreated sewage as fertiliser during the autumn of 1941 and Professor Seddon wondered if the epidemic could have been water-borne. The lumbar section of the cord was the most frequently affected. There were 27 cases of abdominal paralysis; cases of facial paralysis were usually associated with paralysis of a limb; and there were some cases of bulbar paralysis. Considerable ingenuity was needed for the preparation of splints and apparatus for remedial exercises. Crippling occurred in a quarter to a third of the cases.

Contributing to the discussion Sir Arthur MacNalty dealt with his own experience of respiratory and intestinal modes of spread; Dr. F. E. Camps gave some details of an outbreak in Essex which was possibly food-borne, and Dr. Agius Ferrante, in describing some of the early clinical features in the Malta outbreak, stressed the importance of periodic flushings of the face, abdominal colic and uneasy micturition. Replying to questions Professor Seddon said that the weather at the time was like our early autumn, that flies were prevalent, that many of the affected breast-fed children were getting supplementary feeds, and that the relief food-supplies did not come until after the epidemic had begun.

BLOOD-PRESSURE AND OLD AGE

WHAT constitutes "high" blood-pressure is a question whose importance increases as the population grows older. Few would now rely on the old dictum that the normal systolic blood-pressure, expressed in mm. Hg, equals 100 plus the patient's age expressed in years. In an investigation of over 10,000 healthy subjects, Robinson and Brucer[1] contend that at any age 120/80 mm. Hg is the upper limit of normality. Analysis of their figures, however, suggests that this is not true for old age. Only 189 of their 7478 men were over 65, and the statistical method used resulted, when aged subjects are taken at random, in the exclusion of over 60% of this group. Fresh light is thrown on the problem by Russek[2] who studied the blood-pressure of 1000 retired seamen between the ages of 60 and 95, residents in a home for aged mariners and nearly all of Scandinavian descent. He found that the average systolic pressure rose from 147 mm. Hg in the 60–64 years age-group (120 cases) to 160 mm. Hg at 85–95 (104 cases); the pulse-pressure rose from 65 to 74 mm. Hg in the same period, whereas the diastolic pressure only rose from 82 to 86. Pressures below 150/95 mm. Hg he classified as "normal"; when the diastolic pressure exceeded 95 he called the condition diastolic hypertension; and the association of a systolic pressure over 150 with a diastolic under 95, he described as systolic hypertension. On this basis he found that the percentage of normals decreased from 67 in the 60–64 age-group to 34 at 85–95; of the entire series 50% were normal. The incidence of systolic hypertension rose progressively with age from 17% to 38%, and accounted for 28% of the total, while the incidence of diastolic hypertension rose from 16% to 28% and accounted for 23%. More than a third of the subjects over the age of 75 had "systolic hypertension" and an analysis of mortality figures showed that their expectation of life was much the same as for "normal" subjects. The prognosis of "diastolic hypertension," on the other hand, was very different.

These findings are comparable with those obtained in two independent inquiries into the blood-pressure of Chelsea pensioners. In 1922 Thompson and Todd,[3] examining 102 pensioners aged 75 to 92, found that in 72 the systolic pressure was less than 170 mm. Hg, while in 70 the diastolic range was 50–89. Twenty years later Howell[4] reporting his observations on 120 pensioners aged 65 to 92, said that their mean blood-pressure varied from 149/80 in the 60–64 age-group to a maximum of 166/87 at 75–79, falling again to 147/79 at 85–92. In other words a rise in the systolic blood-pressure seems to

1. Robinson, S. C. and Brucer, M. *Arch. intern. Med.* 1939, 64, 409; see *Lancet*, 1939, ii, 986.
2. Russek, H. I. *Amer. Heart J.* 1943, 26, 11.
3. Thompson, R. J. C. and Todd, R. E. *Lancet*, 1922, ii, 503.
4. Howell, T. H. *Brit. Heart J.* 1942, 4, 143.

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be physiological in old age, but the diastolic pressure rises more slowly and may even fall. Russek[2] found that the diastolic pressure varied little after the age of 65. On Robinson and Brucer's view that 120 mm. Hg is the normal systolic pressure at all ages only 13% of Russek's 1000 sailors would have qualified as normal. On the other hand Russek's finding that the average diastolic pressure for normals and those with systolic hypertension was only 78 mm. Hg supports the suggestion that hitherto the upper limit of normality for diastolic pressure has been set too high.

ELECTRO-ENCEPHALOGRAPHY IN EPILEPSY

Lennox and his colleagues[1] have published a survey of their electro-encephalographic findings in epilepsy. They deal with records from 1000 adult controls and 1260 epileptics of all ages selected at random from private and clinic patients and comprising, therefore, a rather milder type of the complaint than would be found in institutions. Focal EEG abnormalities are not considered in detail, but focal records are included in the statistics. EEGs are classified as paroxysmal (those showing abrupt and specific alterations of pattern), very slow and very fast, moderately slow and moderately fast, and normal. The determining rates for the slow and fast groups are adjusted for younger patients, and where there is a mixture of slow and fast frequencies the predominant rate is selected for the purpose of classification.

These workers divide the paroxysmal records into three groups: (1) petit mal and petit mal variant, (2) psychomotor and grand mal types, and (3) spikes. Though this nomenclature of EEG records according to clinical type has been criticised[2] they vigorously defend it; they claim that different types of clinical seizure are associated with consistently typical EEGs and that when the same type of paroxysmal pattern is found in inter-fit records it is both logical and convenient to name it by the clinical type with which it is associated, especially as it almost always reproduces the pattern obtained in a seizure in the same patient. Much of the difficulty has arisen over clinical definition. The term "petit mal" they limit to attacks where there is transient loss of consciousness without tonic spasm; if there are convulsive movements these consist of 3 per sec. clonic jerkings of eyelids, head or arms. They say that if petit mal is taken to include any sort of short or mild attack, confusion will result; but if we accept this view, there must surely be many epileptic fits which do not readily fall into any of the authors' three categories. The further claim is made that the three types are marked off not only by clinical manifestations and EEG records, but also by a tendency to appear and disappear at certain ages, a sex-incidence, a differing reaction to drugs and a different relation to biochemical states well exemplified by the effect of over-ventilation, or of blood-sugar alterations, on clinical petit mal and the wave and spike records.

In the summary of results the frequency records (as distinct from the paroxysmal) show in control subjects a simple curve with the node at the 10 per sec. rate, whereas the epileptic curve is binodal, with nodes on the fast and the slow sides. In the paroxysmal records adult epileptics appear 33 times as often as the controls, and in very fast and very slow records 20 times as often. The 3 per sec. wave and spike formation is found in 77% of patients with a history of petit mal, in 6% of epileptics without such a history, in 3·5% of relatives of epileptics, and in only 0·2% of non-epileptic patients and normal controls. Some type of paroxysmal discharge occurs in 51% of epileptic children, 29% of epileptic adults, 6% of relatives of epileptics, 1·2% of patients with organic neuropsychiatric conditions (cerebral trauma, tumour, abscess, vascular disease, syphilis) without fits, 0·5% of patients with functional neuropsychiatric conditions (schizophrenia, mania-depression, migraine), and 0·9% of normal controls. Taking very fast and very slow frequencies, as well as paroxysmal records, as indicative of epilepsy, it is concluded that a routine EEG is of great diagnostic value in about half the patients with a history of seizure.

1. Gibbs, F. A., Gibbs, E. L. and Lennox, W. G. *Arch. Neurol. Psychiat.* 1943, 50, 111.
2. Finley, K. H. and Dynes, J. B. *Brain*, 1942, 65, 256; Jasper, H. in Penfield and Erickson's Epilepsy and Cerebral Localisation, 1941, p. 415.

LIVE VERSUS KILLED TYPHUS VACCINES

THE relative merits and demerits of typhus vaccines made from live and killed rickettsiæ have been much discussed of late. A comprehensive account of them was recently given by Biraud, of the Epidemiological Intelligence Service at Geneva[1]; but Dyer,[2] one of the foremost typhus experts in America, has been quick to take Biraud to task for championing the use of live-virus typhus vaccines. Another contribution now comes from Clavero and Gallardo, of the Instituto Nacional de Sanidad, Madrid.[3] These workers found that one of the rickettsia strains isolated during the 1941 epidemic of louse-borne typhus in Madrid, and maintained by passage in the developing chick embryo, had lost its virulence for laboratory animals but retained its immunising power. These findings were obtained in experiments on guineapigs and monkeys (*Macacus sylvanus*) and in the latter species use was also made of the Weil-Felix and the Giroud tests as criteria of induced immunity. Though the number of animals in the experiments was not great, the authors felt that their results justified a preliminary report.

It will be remembered that live-virus vaccines have been employed on a large scal by French workers in North Africa, but not elsewhere. These vaccines were made from rickettsiæ of flea-borne or murine typhus, which is much less severe than the epidemic or louse-borne variety. Nevertheless there have been serious mishaps when the vaccines were given to subjects who were more susceptible to typhus than is the indigenous population of North Africa. The live-virus vaccines of Blanc (biliated flea-virus) and of Laigret-Durand (mouse-brain) contain rickettsiæ which are not attenuated and may produce vaccinal murine typhus if the dosage is slightly too strong, or fail to give protection if the dose is slightly too small. The attenuated strain of the far more dangerous louse-borne virus, which Clavero and Gallardo now propose using instead of the murine virus, is not likely to commend itself to opponents of the employment of a living typhus vaccine. Some years ago Cox[4] observed that rickettsiæ from yolk-sac culture may lose their virulence and retain their immunising power, but this discovery did not lead to the introduction of such cultures as live-virus typhus vaccines.

Sir ERNEST GRAHAM-LITTLE has been elected chairman of the Parliamentary Medical Committee in place of the late Sir Francis Fremantle.

1. Biraud, Y. *Bull. Hlth Org.* LoN, 1943, 10, 1.
2. Dyer, R. E. *J. Amer. med. Ass.* 1943, 122, 828.
3. Clavero, G. and Gallardo, F. P. *Revista de Sanidad e Higiene Pública* (Madrid), June, 1943.
4. Cox, H. R. *Science*, 1941, 94, 399.

TEMPORARY TONIC MOTOR PARALYSIS.—Major G. DE M. RUDOLF informs us that a paper with this title, dealing with a condition which he believes has not hitherto been described, has been deposited in the library of the Royal Society of Medicine, Wimpole Street, London, W.1. This paper may be consulted by any who are interested, but "as the condition is probably of a psychological nature, it is considered unwise in the national interests to publish a description of it until after the close of hostilities."

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Special Articles

PHYSICAL MEDICINE: ITS SCOPE AND DUTIES

LORD HORDER'S SURVEY [1]

THE formation of the British Association of Physical Medicine comes at an appropriate time. We are about to face, in grim earnest, the problems that have to do with reconditioning and refitting physically, mentally and spiritually, the men, women and children of the nation, injured in all these aspects by a life and death struggle against a sporadic outburst of barbarism. In the general scheme by which this task may be accomplished medicine has a very great part to play and a great deal of its contribution will inevitably lie along the road of physical medicine.

A description of physical medicine recently propounded by Brigadier Howitt makes an appeal to me. He gives it three functions: (1) the achievement and maintenance of physical fitness; (2) the diagnosis and treatment, preventive and curative, by physical means, of disease and disability of the locomotor system; and (3) the physical selection, training and reinstatement of personnel in industry and in the Armed Forces.

The aims of our association closely correspond with these functions, for the first of them is "to encourage the study of the action of physical agents and their application in the promotion of health; in the prevention and treatment of illness and injury; and in the restoration to fitness."

FITNESS

If this be accepted as our brief, to what cases does it apply? It applies to keeping the fit, fit, which is only another way of stating the case of "positive health" of which, these days, we hear so much. It also applies to making the near-to-fit, quite fit. Both these activities are aspects of preventive medicine, to which the modern reorientation of medicine has been directed. The days of great epidemics which mowed down the people in swathes have disappeared, and there is time for medicine to turn its attention to the individual citizen—time to consider what Herbert Spencer had in his mind when he said that "to be a race of good animals is the first condition of national prosperity." The tempo of our efforts at achieving national fitness, bodily and mentally, has just at present been speeded up. Never was the individual citizen so marked down for hygienic attention as now. But when the stimulus of the war is over, what is to be the incentive to fitness then?

There is no doubt that we have let our bodies go; our civilisation had literally gone to our heads. And our heads weren't standing it too well, either: there were quite a lot of folk bothered by anxiety and fear and sleeplessness and odd tricks played by their nerves. So let us give the body a chance for a bit, and don't let us think we are wasting time in doing so. In this field physical medicine must play an important part—indeed the most important part. It must lead and guide and control.

APPARATUS, EDUCATION AND RESEARCH

The association's brief also includes control of the whole range of those physical measures of diagnosis, prognosis and treatment which go conveniently by the name of physiotherapy. Into this group come skilled manipulation, massage, gymnastics, remedial exercises, balneology and other forms of hydrotherapy, the application of light and heat and cold in various ways, other kinds of ray therapy and electrical methods. It is in connexion with this object of the association that the further aim "to evaluate apparatus and methods claimed to be useful in physical medicine" will prove of help, both to our profession and to the public.

The test of all claims to add to the armamentarium of the doctor is the ability of their exponents to state pathology clearly and to demonstrate that the method or apparatus follows recognised principles of science in its construction and its action. The public have great faith in apparatus; they think an instrument cannot lie. We have to save them from themselves. We must resist the temptation to play up to their demand for the machine or to give them the physiotherapist equivalent of the bedside manner.

And here we must consider the spas and health resorts of this country. Their status, and the position which they have so far taken in physical medicine, are notoriously unsatisfactory. Dr. C. W. Buckley has just compared the use made of spas by our Soviet Allies with ours at home—much to our discredit. He thinks that we must be much more democratic in our outlook upon spa possibilities. He speaks of the need for education of the state, education of the doctor in the spa, education of other medical practitioners and perhaps finally education of the general public in the uses and value of spas. Here indeed is pertinent work for this association.

Our brief covers efforts at correcting deformities, both congenital and acquired; the overlap between this association and the work of our orthopædic colleagues is therefore considerable and we shall look to them for strong support. We also cover much that is known, and perhaps still more that is unknown, in the ætiology and treatment of the chronic rheumatic diseases, in which we have close affinity with the Empire Rheumatism Council.

In some fields of medicine we have gone ahead with treatments in the absence of exact knowledge of the causative factors (as in cancer) or lacking specific therapy, though the causative factor is known (as in tuberculosis). In cancer a form of physical treatment (radium and X-ray therapy) has brought us relatively good results. In tuberculosis a series of physical methods have changed for the better the outlook for the chronic case. Let us bear these things in mind when we remember that some of the ætiological factors, whether microbic or metabolic or neurogenic, are still obscure in relation to many cases of rheumatic disease.

There is scope and need for research in methods of physical treatment, and this issue is closely bound up with education. Our constitution stresses the importance of undergraduate and postgraduate training in the principles and practice of physical medicine, and exists to encourage both of these. We hold a brief for improving the status of the physical medicine specialist and for securing a diploma in physical medicine. The endowment of one or more university chairs would help us further towards attaining our aims than anything else.

Finally, to educate the community in the value of physical medicine is a big task; but we must not hesitate to undertake it. It includes close coöperation with the educational authorities, with schools and with industry.

THE OPENING PROSPECT

We have outlined our strategy; our tactics have yet to be considered. The very fact that we are on the verge of great changes in our national health administration necessitates caution, and the association is but newly born.

Nearly twenty years ago, in opening the winter session at the Leeds School of Medicine, I chose physical medicine as my theme and urged the formation of a parent society. Wherever, whenever, since then, I have seen authentic, valid and scientifically controlled efforts at developing particular aspects of this great branch of medicine I have done my utmost to further them. Not all my causes on behalf of physical medicine have been won, but now, as the result of your loyal and effective help, and your determination to sink individual views and preferences in the common interest, there has been formed the British Association of Physical Medicine. Its future lies with you.

1. Extracts from Lord Horder's presidential address at the inaugural meeting of the British Association of Physical Medicine held in London on Oct. 20.

PROPHYLACTIC SULPHONAMIDES IN JUVENILE RHEUMATISM.—In view of favourable American reports, the education committee of the London County Council have arranged that prophylactic treatment with sulphonamide shall be given to 100 selected rheumatic children attending supervisory centres. These centres are staffed by physicians experienced in rheumatic disease in children and the results will be controlled. None of the children chosen will be receiving treatment elsewhere, and the consent of the parents will be obtained. Blood examinations will be made regularly so that any case of granulopenia will be discovered early.

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WOUND HEALING

THE CAMBRIDGE CONFERENCE

THE 55th conference of the Society for Experimental Biology, held from Sept. 22 to 24, took the form of a symposium on wound healing. No meeting of similar size with this as its subject had been held in England since that convened by the Medical Research Council in November, 1940; and comparison of the two demonstrates steady, if nowhere spectacular, advance in understanding of the biological principles of wound healing and how they may best be put into practice. Two contributions in particular—the local application of sulphonamide powders for controlling wound sepsis, and the use of penicillin—which were reported at the earlier meeting in the laboratory stage of investigation, have now been widely received into clinical practice. Mr. E. CHAIN, PH D (Oxford) and Dr. MARY FLOREY (Oxford) reviewed the chemistry and the present clinical standing of penicillin; and their evidence showed that in all respects, except large-scale manufacture, penicillin has fulfilled its earlier promise. Dr. F. HAWKING (London) gave a practical-minded review of the behaviour of sulphonamides in infected wounds and the means by which their effects could most economically be secured.

The importance of vitamin therapy in the systemic treatment of wounds was recognised before the present war; but, as Mr. L. J. HARRIS, D SC (Cambridge) pointed out, only vitamins C and D were known to have a special significance for wound healing. Even so, no special nutritional principles are thought to be involved: the action of vitamin D in securing calcification, and of vitamin C in promoting the activity of all classes of formative cells, is essentially the same in wound repair as in physiological development. Mr. P. D. F. MURRAY and Dr. E. KODICEK (Cambridge) and Mr. G. H. BOURNE, D SC (Oxford) described their histological observations on the effects of graded vitamin-C deficiency on the maintenance and healing of bones and soft tissues in the guineapig. Their work served to emphasise the reality of subclinical deficiencies: there was every reason to suppose that lack of vitamin C had a significantly harmful effect in man on dietetic levels at which the clinical signs of scurvy do not appear.

The subject of general metabolism during wound repair was adequately, but—in view of the biological nature of the conference—not exhaustively discussed. Dr. D. P. CUTHBERTSON (Glasgow) and Dr. R. J. ROSSITER and Mr. E. J. CLARK (Oxford) described clinical and laboratory investigations on protein metabolism during wound healing, particularly after burning; and these were supplemented by a description of histological changes in burned skin by Mr. E. H. LEACH (Oxford). It was not certain, Dr. CUTHBERTSON said, whether the loss of N, S, K, and P in the "flow" phase of metabolism after burns and other injuries is due to depressed general anabolism or to an increased protein katabolism: high-protein diets did not make good the loss; nor apparently did preliminary periods of protein inanition accelerate it. But it was a reasonable inference that in any condition involving debility through tissue loss the patient's diet should contain gradually increasing quantities of protein—particularly animal protein, for its high content of cystine and methionine.

At the outset of the meeting, Mr. E. N. WILLMER (Cambridge) had insisted that wound healing was fundamentally a cellular process. It depended on a delicate equilibrium of cellular activities which varied with the size and nature of the lesion, and which—in attempts rashly to stimulate one or to suppress another—we might easily upset. He agreed with Prof. PATERSON ROSS, FRCS (London), who defined the clinical fundamentals of wound treatment, that the natural process of repair required not acceleration but only an opportunity to exert itself in the most effective way.

Contributions on the cellular aspect of wound healing naturally took the lion's share of the contributions; and it would have been wrong to expect each one to lead directly to clinical innovations. Miss HONOR FELL, D SC, and Mr. J. F. DANIELLI, D SC (Cambridge) led the way to an understanding of the biochemical background of at least one formative process in wound repair, by producing evidence of the circumstantial relationship between the presence of alkaline phosphatase and the formation of collagen fibres. Mr. M. ABERCROMBIE, D PHIL (Birmingham) described the relationship between cell movement and cell proliferation in the union of severed nerves—a study of particular importance for biologists, who have long recognised the significance of this cellular relationship in the earliest stages of development. Mr. J. Z. YOUNG (Oxford) translated the observed behaviour of axon protoplasm in the central and peripheral stumps of divided nerves into terms of colloid chemistry, and showed how the nucleus of the neuron might maintain the integrity of the axoplasm by keeping its long fibre-like molecules in their correct morphological alignment. Mr. A. H. S. HOLBOURN (Oxford), in a similar way, sought the cause of the distribution of brain lesions in the mechanics of shear stresses (see *Lancet*, Oct. 9, p. 438). Experimentally, and in clinical practice, lesions occurred in those regions of the brain where unilateral tensions and compressions exceeded a certain critical value. Dr. DOROTHY RUSSELL (Oxford) said that although healing processes in brain wounds are fundamentally similar to those following injuries to other tissues, the extent of the initial necrosis and ultimate scar-formation are relatively greater; and because of the superficial position and vulnerability of the vessels supplying the cerebral convexities, only those chemotherapeutic agents should be used which had a minimal damaging effect on tissue—notably penicillin solutions.

A contribution from Lieut. J. M. BARNES (Oxford) on vascular changes after injury bridged the gap between the cellular and the systemic line of approach. He described the significance of reflex arterial spasm after injury, and particularly emphasised the importance of interfering with the delicate and unstable wound circulation as little as possible.

Plastic surgery is that department of medicine in which the clinician has always been ahead of the laboratory worker; not only in recognising the biological principles of wound repair, but also in putting them effectively to work. Mr. RAINSFORD MOWLEM, FRCS (London) impressed the conference by showing that bone-grafts consisting of loosely packed chips of cancellous bone will heal promptly, soundly, and in the correct morphological relations, and maintain the highest resistance to infection. He contrasted their behaviour with that of massive saw-cut grafts of compact bone, which were commonly used on the faulty assumption that bone, like tendon or fascia, is an inert tissue. The concept of cellular survival should regulate the plastic repair of bone. Dr. H. T. BARRON (London), reviewing his experience of 800 cases of plastic repair by skin autografts, described the principal variables of graft healing and the probable biological explanation of each. Dr. A. GLÜCKSMANN (Cambridge) had examined the histogenesis of scar keloids in 70 of Mr. Mowlem's and Dr. Barron's cases. He had found evidence that keloids were essentially fibrosing granulomata, not true fibromata; and that they started from an originally localised—though ultimately diffuse—reaction towards extrinsic or intrinsic foreign bodies in sensitive patients. In experimental and clinical studies with Dr. T. GIBSON (Glasgow), Mr. PETER MEDAWAR (Oxford) had found striking circumstantial evidence for the astonishingly neglected theory that skin homografts fail in man, and in other mammals, because they generate an active immunity in their recipients. There could be no question of using skin homografts in clinical practice, other than as wound dressings, until—if it were ever possible—the genetic background of tissue compatibility had been worked out.

The conference might well have concluded by further reflection on the lines upon which Prof. H. A. HARRIS, MD (Cambridge) opened it. The problems that John Hunter described on his return from the Peninsula were much the same, he said, as those we face today; and in the 14th century John Aderne formulated principles of wound treatment to which we have little to add. There was a continuity, in medical history, of the central problems of scientific treatment; periodic wars gave them peculiar urgency, but not novelty. Humility, born of this sense of history, may not be a powerful stimulus to the prosecution of scientific work; but it should govern its appraisal. At all events, it could in this case be qualified by a reasonable satisfaction at some definite scientific achievements.

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TEACHING OF PSYCHIATRY

THE approach to the psychological and social aspects of disease has changed profoundly in the last twenty years; and the change is reflected in the two interim reports just presented to the Royal College of Physicians by their committees on psychological, and on social and preventive, medicine. The implications of the latter report are discussed in our leader (p. 546); the psychological report, which is complementary to it, recognises that psychiatry has grown beyond the stage at which the student's needs could be served by a dozen lecture-demonstrations at a mental hospital: his training in it must now rank among the most important parts of the curriculum.

The report suggests that every teaching school should have a department of psychiatry for outpatients and in-patients with an adequate teaching staff—"as a minimum, a psychiatrist, a psychiatric registrar, a resident, a number of clinical assistants, a psychologist trained in intelligence testing, psychiatric social workers and secretarial assistants." Psychiatry would thus be represented by a complete unit. The committee, moreover, look forward to the day when there will be a professorial chair of psychiatry in every medical school. The clinician attached to the department of social and preventive medicine should work in coöperation with the department of psychiatry as well as with the other departments of the hospital.

The student, they consider, should take a course in normal psychology towards the end of his second pre-clinical year, and an introductory course in the psychiatric aspects of clinical work at the beginning of his first year in the wards. Throughout the clinical period he should take a systematic course in psychiatry. The syllabus cannot be rigidly laid down since it must be flexible enough to suit different hospitals, but they feel that the course of lectures and demonstrations should be amplified by seminars and discussion groups covering the whole range of mental disorder and mental deficiency. The course would include meetings in the outpatient departments and wards of the hospital, at local psychiatric centres or admission wards in mental hospitals, and visits to mental deficiency institutions, child guidance clinics and pædiatric outpatient departments. The student should spend three months as a clerk in his own hospital psychiatric department during his first or second clinical year, combining the post with work in one of the other special departments—preferably the department of neurology. He should examine and make case notes on at least 6 psychotic and 20 neurotic patients.

A suggested systematic course covers principles of diagnosis, general causes and pathology of mental illness, principles of prevention and treatment (physical, psychological, and social), toxic and organic syndromes, affective syndromes, schizophrenia, psychopathic personality, hysteria, obsessional syndrome, other psychological aspects of physical disease, children, mental deficiency and forensic psychiatry. It is suggested that during the last clinical year a short resident period in a mental hospital or a clinical clerkship in an observation ward might form part of training, coupled with domiciliary visits in the company of a psychiatric social worker. The committee attach much importance to the teaching of mental deficiency and advise that six of the lecture-demonstrations in the systematic course should be on this aspect of psychiatry and that at least two of them should be conducted at an institution for mental defectives.

Finally the committee propose that the student's knowledge of normal psychiatry should be tested by examination at the end of the preclinical period, and that in the finals there should be a separate examination in psychiatry, to be taken either at the end of the clinical period or earlier.

BRITISH PÆDIATRIC ASSOCIATION.—The September issue of the *Archives of Disease in Childhood* contains two reports by this association, one on the early diagnosis of tuberculosis in childhood, and the other on arrangements for newly born babies in maternity hospitals. Copies of these reports may be obtained from the acting honorary secretary, Dr. Donald Paterson, 27, Devonshire Place, London, W.1.

In England Now

A Running Commentary by Peripatetic Correspondents

SOME of your correspondents seem to me ignorant of the facts of life, as applied to their profession. There was the one who maintained that we are "probably the best educated, most intelligent, most altruistic and most worldly-wise group in England today." No Sir, I am afraid we are neither well educated nor particularly intelligent. The old tradition still holds good that if parents are in doubt how to dispose of their more stupid offspring, the only profession in which they can be assured of a guaranteed job is medicine. Any experienced teacher will agree with me that the student who cannot pass a qualifying examination in medicine is mentally deficient. Those members of the profession who have outstanding intellectual ability are, with a few obvious exceptions, to be found in the ancillary sciences such as physiology and biochemistry. Speaking generally there is no intellectual satisfaction to be obtained in the practice of medicine (or surgery)—emotional satisfaction, yes, and even spiritual satisfaction for some, but the doctor who tries to run his practice on a rational and logical basis will soon find himself in the workhouse. Then, to talk as if a state medical service means the end of all personal initiative and freedom, while the present system of practice is a valhalla of complete freedom, has no relation to reality. What freedom does the average GP or consultant possess? What consultant dare refuse a call, even at the most inconvenient moment? What GP dare ignore a summons from a patient? No, the present archaic system is the acme of slavery and serfdom. Either from financial reasons or simply in order to build up a reasonable practice the practising doctor of today has no semblance of liberty of action.

* * *

If it must be Sicily or North Africa give me Sicily every time. Nobody seemed to be taking much notice of us as we tripped up the beach from our invading craft. That nonchalant air which characterises the British soldier as he steps out on a foreign strand, and which you have doubtless noticed in the news reels, is quite genuine. It seems the most natural thing in the world to Tommy Atkins that he should trail away into Sicilian orange groves and "brew up" as though he were on Salisbury Plain. I don't know whether it was the custom in the last war, but when a meal or a hot drink is ready for serving, the cookhouse staff set up the cry, "Tea up"; or in the case of a set meal, "Come and get it," and the invitation is accepted with alacrity by all. But if we were casual in our demeanour as invaders, the conquered people were even more so. True there were no "tears of joy," but there was not the slightest sign of resentment; and many of the peasants gave us a smile and the V sign with their fingers as they passed by on their carts and buggies. The flight of Mussolini and his gang of thugs was a matter of great satisfaction to them, and many anti-fascists had seized the opportunity to deface the silhouette of Il Duce which appeared on nearly every white wall in the villages we passed through. Sicily, at all events, seems to have had a raw deal from the fascist administration. The villages, picturesque and bizarre when seen in the distance, are tawdry and squalid on closer inspection. Sanitation is primitive in the extreme, and the dwellings emit a disgusting smell which drifts well beyond the boundaries of the place. On the other hand, the picture postcards are exceedingly attractive. Furthermore, the inhabitants are fortified by high-sounding extracts from Mussolini's speeches plastered on the walls of nearly every room of the schools and other public buildings. Exhortations to work, to multiply, to suffer, and if necessary to fight and conquer, have evidently served as political blood-transfusions for a poverty-stricken population for nearly two decades.

Having reached the new location in which the Unit is to function, one settles down to the job of helping to make the wheels go round, and quickly becomes detached from the foreign background. The avalanche of patients descends on the establishment. The familiar rhythm of working, eating and sleeping is re-established. Etna and its wisp of volcanic smoke fade into the background; the horizon is limited by a broken ring of "GS Doubles"

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—as the ward tents are officially described—and the inexorable routine of disposing of the sick and wounded occupies nearly all of one's waking hours. The reception tents are never empty. One MO cannot keep pace with the new arrivals. Constantly stooping over stretchers, which move along from the MO's section to the clerks' department like motor-cars on a moving belt, one writes the gist of the story and findings on the "3118" in staccato English reminiscent of Tidy's *Synopsis* or Hey Groves. What a vast amount of repetitive work! "Right thigh, middle anterolateral aspect, T and T wound, MG bullet. General condition good. Ward S1. Morphine gr. ¼. Evacuate." And *after* the battle, the usual pattern is: "Headache, loss of appetite, vomiting, shivering, sweating, 2 days' duration. Spleen palpable. For blood-film. Start quinine gr. 10 thrice daily. Fluids freely. M1 Ward." In medical units no less than in the combatant, war is characterised by long periods of inactivity and boredom, and short bursts of feverish work. Unfortunately during these active periods, when interest in medicine revives, the volume of the work makes it essential to concentrate on disposal of cases rather than a detailed study of their medical aspects. It is imperative to perfect the art of spotting the really ill man—the candidate for resuscitation and the probable "MT" who will slip through your fingers unless he gets his quinine intravenously within the hour. Perhaps one tends to underestimate the value of this kind of work. One is inclined to grumble about the contrast between clinical practice in the field and at the base, and one sometimes becomes quite cynical about the high-falutin ideas on what *ought* to be done expressed by old gentlemen in sumptuous general hospitals at home. But in more sober moments one is obliged to admit that under battle conditions the doctors put up a pretty good show: expedience always looms large, but it doesn't eliminate scientific medicine completely.

* * *

"We were recently accused of being pre-1914 in our outlook. However that may be, we still contend that the prime work for women, in that it is only they who are capable of carrying it out, is the begetting (*sic*) of children and the running of the home. We would go even further and add that for the majority of women this is a whole-time job and one which should be recognised as such by the State. Under modern conditions, in this country at least, all women unfortunately are not able to subserve this function and for such we would suggest that there are at least two forms of work which they can do better than men—nursing and teaching of the young. So far as the former is concerned, it seems to be overlooked that no man can make an efficient nurse, whereas, to put it no higher, the average male doctor is just as good as, if not better than, the average female doctor."
—Editorial *St. Thomas's Hospital Gazette*, October, 1943.

My dark unconscious writhes and squirms
To think how woman cheats me.
We must not meet on equal terms
As complementary fellow worms
In case the jade defeats me.
When nature gave this rival twist
To bearer and begetter
She hid it in a jealous mist.
I *must* insist, I must *insist*
That I am far the better.

* * *

I am just returning to life after a go of tonsillitis—about as obviously organic a complaint as you could find—yet no less than three of my ci-devant friends (now struck off) have already brought up the old couvade "joke" against me. I don't know whether there is any truth in the couvade notion, and don't care, but it has got so widely held that an expectant father can't get a blessed thing these days, from ingrowing toenail to cerebral tumour, without being labelled a neurotic dirty dog. Why, a chap I know had the most terrible toothache during one of his wife's pregnancies, and even when the dentist opened a bag of pus bigger than the tooth he was still treated as a pariah.

The Minister of Health has appointed Major William Woolley, MP, to be his parliamentary private secretary, in succession to Colonel Frank Medlicott, who has taken up a military appointment.

Parliament

FROM THE PRESS GALLERY

Pension of RAMC Officer's Widow

ON the motion for the adjournment Mr. QUINTIN HOGG raised the pension awarded to the widow of Mr. William Bremner Highet, a surgeon of Wingfield Hospital, Oxford, who since the beginning of this war had acquired experience in dealing with soldiers suffering from nerve injuries. In 1942 he was asked to form a new centre in South Africa for soldiers injured in the Middle East. The post carried with it the rank of major. From the outset, said his colleague in the hospital at Oxford, it was agreed that Mr. Highet should go with the rank of major. But to his dismay he was commissioned as a lieutenant. His medical colleague took up the case immediately with the Central Medical War Committee and with certain Army consultants, Brigadiers Bristow, Cairns and Riddoch. An assurance was given that Mr. Highet's promotion was only a matter of days, and that he would not hold merely the temporary rank of major. Major-General Monro, consulting surgeon to the Army, sent the following letter to Mr. Highet's colleague:

"I passed the letter to AMD 1 with the following comment: 'Highet most certainly would have been classed as a specialist surgeon (neuro-surgeon) and this, I maintain, should have been done before he embarked for S.A. to take up an important post.'"

Mr. Hogg also quoted from a copy of the War Office minute sent by D. P. Stevenson, DADG, from AMD 1, which said: "It is unfortunate that promises were made in writing to this effect"—namely, that Mr. Highet should have a major's appointment—"by Brigadiers Rowley Bristow and Riddoch." The minute went on to show that Mr. Highet was given the rank of lieutenant only because of the technical regulations then in force. The ship in which Mr. Highet was travelling to South Africa was torpedoed and he was drowned. Now his widow was awarded only a lieutenant's pension. The Secretary of State for War, with whom he Mr. Hogg had raised this matter, had admitted that if it was considered that the case justified exceptional treatment it would be possible under the Dispensing Warrant to grant the rank of major from a date prior to that on which the vacancy was filled. The Minister, however, added in his letter that he could not see that there was any question of breach of faith in Mr. Highet's case. Mr. Hogg claimed that an injustice had been done. Any decent employer would have done exactly what he was asking. The word of a subordinate would have been kept. Nobody but the Crown would treat an employee in this way. He doubted whether they were dealing with men so much as bureaucrats, born in a pigeon-hole, swaddled in red-tape, educated at the Treasury, and reaching manhood as a civilian in the War Office. When at last they were removed to another place no doubt there would be written on the tombstone a Treasury minute instead of an epitaph, "Passed to you for further consideration and comment." If this was the way that the Crown treated servants and Sir James Grigg administered his office the sooner he moved from his position the better.

Mr. ARTHUR HENDERSON, Financial Secretary to the War Office, in reply said that he agreed that Mr. Highet was an orthopædic surgeon of great ability who volunteered for service in a special, indeed an important, appointment in South Africa at the request of the War Office. He also agreed that the appointment as such carried with it the rank of major. Mr. Highet had had considerable experience in dealing with nerve injuries and there was no doubt that his services would have been of the greatest value. Mr. Henderson quoted from official correspondence to show that it was made clear to Professor Seddon, Mr. Highet's medical colleague, that on assuming the overseas appointment Mr. Highet would be raised to full specialist status, which carried with it the rank of major. Mr. Henderson had not been able to ascertain whether the contents of this letter were conveyed to Mr. Highet, but he thought they were. He claimed that unless and until Mr. Highet assumed the duties of his post he was not entitled to the acting rank of major. He was quite ready to accept Mr. Hogg's

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statement that promises were made by certain officers but they were not carried out before Mr. Highet left for his destination abroad. Sir ALFRED BEIT and Sir PETER BENNETT supported the plea put forward by Mr. Hogg. In reply Mr. HENDERSON said he was somewhat loth to respond to Mr. Hogg because he thought he had made a vicious attack on Sir James Grigg. None the less in view of the strong representations that had been made he would certainly undertake to convey to the Secretary of State the feeling of the House that this case should be given special consideration.

QUESTION TIME

Disease and Famine in India

Mr. R. W. SORENSEN asked the Secretary of State for India what information he had respecting the cholera in Malabar and in other parts of India; whether there was a shortage of drugs and medical supplies for civilian use in India; and what information he had received from the Central Government respecting the spread of disease, assistance needed in combating this, and the approximate deaths to date due to famine.—Mr. L. C. AMERY replied: There have been reports of cholera in various parts of India. I have not so far had any indication of any widespread outbreak or of any special difficulty experienced by the provincial governments concerned in dealing with the outbreaks of this or any other disease. I have not had recently any report of shortage of drugs or medical supplies for civilian use nor any special report from the central government respecting the spreading of disease nor any request from them for assistance in this connexion. As regards deaths due to famine, the government of India report that figures are as yet incomplete and unreliable, especially in respect of the districts, and I am afraid it must be some time before the loss of life can be even approximately stated. It may afford some guide that in Calcutta mortality is reported as about twice the normal for the time of year and that between mid-August and mid-October about 2000 persons suffering from malnutrition have died in Calcutta hospitals.

Diet of British Prisoners in Far East

The Secretary of State for War, in reply to a question, stated that the reports received from the Protecting Power and the International Red Cross Committee regarding conditions in camps in Japan, Korea, Shanghai and Hong-Kong, indicated that prisoners generally were probably receiving a ration not less than that applicable to the Japanese depôt troops; it consisted generally of polished rice with a little flour, vegetables, fish and sometimes a little meat; fruit was sometimes available in Japan and rations in Shanghai had often been supplemented from local supplies by the efforts of local friends or the International Red Cross Committee delegate. But the evidence left no room for doubt that these rations were inadequate to maintain our prisoners over a long period in reasonable health and the Japanese Government had been pressed to remedy its deficiencies in energy value, animal protein, fat, calcium and vitamins. In particular they had been asked to supplement the diet with soya beans (which contain practically all the deficient properties), but they had refused owing to alleged lack of supplies. They had also been urged to issue unpolished rice instead of polished rice, but they claimed that the bulk of the available rice was already polished; some rice bran had, however, been issued.

Medical Man Power

Mr. HENRY WHITE asked the Minister of Health if he would give consideration to the position of industrial areas where there was either a shortage of doctors or an inability to obtain satisfactory relief so that attention could be given to patients; if he was aware of the strain thus placed on the local doctors and the many long periods of waiting endured by the patients; and would he take steps to put into operation some system of transfer that would relieve the pressure and secure a more equitable method of medical attention.—Mr. E. BROWN replied: The Central Medical War Committee and its local committees, in selecting doctors to make up the quota required by the Forces, do their best to maintain an adequate medical service for the civilian population, but I am afraid that in some areas there must inevitably be a heavy burden on the remaining doctors and some inconvenience for the public. For the areas most in need of help, arrangements are being made through the CMWC in accordance with a recommendation of the Shakespeare Committee for the employment of suitable doctors as assistants in general practice. These will be selected mainly from those found unfit for service in the Forces and the powers of direction under the Defence Regulations will be used so far as appropriate for this purpose.

Psychological Examination of Young Women

Mr. RHYS DAVIES asked the Minister of Labour whether he had considered the representations from the council of the Magistrates' Association, stating that they were alarmed at the number of young women sent to prison for failing to comply with his directions and urging that such women should be psychologically examined before they were prosecuted.—Mr. BEVIN replied: The present arrangements provide for such an examination to be undertaken where this seems desirable and I am exploring the possibility of improving the present methods of identifying appropriate cases for special examination.

Rehabilitation of Prostitutes

Mr. H. LINSTEAD asked the Minister whether, as the fact that his department had found in practice that it was useless to direct prostitutes into National Service indicated the need for a comprehensive inquiry to devise constructive measures to deal with the treatment and training of the social and industrial misfit, he would now set up such an inquiry.—Mr. BEVIN replied: I do not think that the difficulties of dealing with the class of person under the National Service scheme are a sufficient reason why I should undertake the suggested inquiry which would raise many social and medical issues extending far beyond the sphere of my department.

Letters to the Editor

CONTRACTING OUT

SIR,—Mr. Lucas Young, in your issue of Oct. 16. analyses the problem clearly enough up to a point. All the difficulties he pictures would undoubtedly arise. But he seems rather to imply that merely to forbid contracting out would prevent or solve them. He writes as if there were something obscure or unreal about that "little something" for which some citizens would wish to step outside the free and equal-for-all comprehensive medical service.

There is no mystery. The citizen would wish, first, to secure for himself half an hour of his doctor's time.—"When can you give me half an hour, doctor? I have something I want to discuss with you." "The clinic is all right," said a young mother who came to discuss weaning problems, "but they only give you two minutes. Yes, literally!"

Second, he would wish to consult a doctor who was not the whole-time paid servant of anyone, and who owed no allegiance to any corporate body, a man responsible solely to him and to his own conscience and free to speak his mind. "They tell me at the hospital . . ." or "The school doctor says . . ."—"so I have come to you to ask your opinion."

Third, he would wish, sometimes, to consult his doctor without the knowledge of friends, relations or neighbours, and occasionally he would have good reasons for desiring a consultation at his own home, though not confined to the house by illness.

None of these, be it noted, is a frivolous extravagance or a foible of the rich. They are all reasonable things to wish for, all have their place in good practice, all are demanded and obtained every day as a matter of course from thousands of ordinary doctors by thousands of ordinary citizens who pay gladly for them according to their means. All would be difficult, some impossible, to obtain from a whole-time salaried service, especially from one based on clinics. Can anyone believe that citizens would not continue to desire these small but sometimes precious privileges; can any doubt what they will do if the service cannot supply them and they cannot contract out? They will go to any practitioner, registered or not, outside the service, who seems able to supply what they miss.

The truth is, of course, that although with good organisation and high taxes the state could in time provide

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efficient medical service for every citizen, it can never, by any expenditure or effort of organisation, provide for every citizen the best that private practice has to give; and if everyone must have the same the best must go. The state could provide for every citizen three good meals a day and ensure that nothing worse than second-best beef was ever served. It could never provide for every citizen a meal that a chef would call a first-class supper, and if all must sup alike then a first-class supper must be permanently denied to every citizen. Can we not have the courage to recognise that "the best for everyone" is an idle dream?

I agree with Mr. Lucas Young that the notion of contracting out is an unworkable compromise; but believing as I do that the best should not be sacrificed to the average, and that freedom is worth its heavy price, I hope the citizen who prefers a free man for his doctor will never be made to wish he *could* contract out.

Hampstead, N.W.3. LINDSEY W. BATTEN.

SIR,—The obvious conclusion to be drawn from the first half of Mr. Lucas Young's interesting letter is that those who are not covered by a "state" scheme should join a contributory scheme which would give the full advantages of private practice without the fear of unknown medical expenses. His analogy of medicine with education breaks down on this point, because when a boy is sent to a public school one knows almost exactly what the expense will be, and this is impossible in the case of sickness unless one is covered by some insurance scheme.

If, as suggested in my letter of Sept. 18, the Government subscribed to such insurance schemes for all those who joined, which is democratically just, then much of the argument of the latter part of his letter would lose its weight, as the Government would be making provision even for those in the voluntary scheme, and no-one can imagine that prices and salaries are going to remain static for the next twenty years, so there is always the possibility of revision.

The real question is whether it is good for private practice to continue, and this cannot be supported on the ground that it gives an extra source of income to doctors. The analogy that Mr. Young draws with food is quite apt. Efficient medical attention is essential, but it is neither so essential or so universally required as food. Surely therefore, according to Mr. Young's argument, it is necessary that every citizen should get his food free and standardised even more than his medical attention? But in fact we know this is neither intended nor desirable. We do not expect to live all the time on basic rations, nor do we wish all the time to be compelled to have standardised compulsory medical service. Progress demands that we give the fullest liberty for improvements to be made—luxuries they will be considered at first, just as baths, handkerchiefs and clean linen used to be considered. Before long however the state patients will demand and obtain them. Furthermore "Lady B." is a human being as much as anyone else, and those who do personal medicine know that treatment which is not willingly accepted is seldom so satisfactory as when the patient coöperates. Why then should she be compelled while she is ill, when she is allowed to be free while she is well?—especially if we can so work it that her desire for special treatment may be used to raise the whole standard of treatment for others.

Lady B. may be largely a social problem. But how about the busy civil servant, the company director and many others whose time is valuable to the community as well as to themselves? Are these to be forced, when they have a trivial ailment—which may not be so trivial—to attend a health centre and waste their time waiting their turn instead of asking the doctor to call at a convenient time? Or if, for the public benefit, they are to be allowed this privilege they will not be treated the same as others, and the whole basis of the unified service breaks down. It is probably impossible to make a comprehensive system which shall be absolutely just and logical, but life is not all logical by any means, and the financial standard is one which is well understood and is a moderately rough guide. If those below the NHI limit were also allowed to opt into the contributory scheme it is most likely that many would elect to pay the extra four or five pounds per annum required on top of the government contribution. They would value the extra conveniences of private practice, the avoidance of waiting for relatively trivial attention, the extra comfort of nursing-homes, &c. The doctor might reap some monetary advantage from having such patients, but the great advantage he would gain would be the ability to see a patient without the state being a tertium quid, and the patient would gain the same inestimable benefit of feeling free. (I do not here refer to freedom of choice which could, I think, be as obtainable under a state scheme as in present circumstances.) The danger of all planning, as even the Fabians from their latest symposium are coming to recognise, is that people may lose their freedom, and it is their individuality that a doctor should seek to cultivate as an essential part of their health. And the state should do its utmost to help them in this for the sake of its own political vitality and health: for states can be sick as well as individuals, and mental and moral sickness is even worse and more intractable than physical illness.

Winsford, Cheshire. W. N. LEAK.

SIR,—Mr. Lucas Young pointed out the difficulties of a medical practitioner under a state scheme wherein the whole population is compulsorily taxed to provide the (at present) ethereal boons of state medicine.

He assumes that it might be possible for a patient to pay extra to the state doctor to get a little extra attention. The policy of allowing a panel patient to go to another panel doctor for "private treatment" has always been a doubtful one, and it is presumably on this analogy that the state doctor might be allowed some such privilege. But, as Mr. Young shows, its working would be so difficult as to make any such arrangement most undesirable. The state doctor must be content with his state lot—or lottery. He cannot run with the state fox and hunt with the free practitioners.

For one cannot agree with Mr. Young's conclusion that all must be of the state. To begin with, there are still a very large number of practitioners who joined the profession under the impression that it was a free one. To force them into a whole-time salaried service seems highly unjust, even for the compelling ideas of the state. Further, the presence of a free profession alongside the state doctors is eminently desirable as a competitive stimulus to both parties. Where private practice and state doctoring run side by side, as in many Crown Colonies, it is the private practice that gets all the best of the work, even though there are many able doctors in the Colonial Service. Nor can there be any objection to a free profession on any ground except the prejudice in the minds of the Whole-time State Slave wallahs.

Perhaps the real objection to Freely Practising Doctors is that it would give the whole miserable show away. For the presumptuous assumption of the Beveridge report that doctors must be available for everyone is only an underhand method of taxing everyone to pay for those who like a few penn'orth of state dope—about six penn'orth a time at the present rate of panel pay—very cheap. The existence of free doctors would imply that all would not want the state doctor. The chances are that the implication would be right, and that no-one would be seen near a state doctor if he could afford a free doctor.

Perhaps the most pertinent argument for the free doctor is that, unless he exists, anyone with a little money will be driven to the Continent or to America if he wants a little first-class private practical medicine. And no doubt he will be catered for. The patient might argue that if he is willing to pay for a little personal attention, he is going to see that he gets it.

In contemplating the whole rather unnecessary business of state medicine one is impressed by the failure of the panel system. If the state had originally undertaken to pay the doctor at "piece-work" rates for what is fundamentally piece-work, instead of endeavouring to extract the last ounce of work out of the doctor for a sweated salary called "capitation fee," it would have had a more rational basis to work on and might have bred something other than distrust in the minds of those who originally entered a free profession.

Chiswick, W.4. THOMAS NELSON.

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THE GOVERNMENT AND THE PROFESSION

SIR,—The Annual Representative Meeting of the British Medical Association has agreed upon certain principles by which any Government proposals for reconstruction of the health services are to be judged. These principles would restrict progress to a postwar "two-way extension" of National Health Insurance. This is considered by the ARM to be a step towards the implementation of Assumption B of the Beveridge Report.

The public, however, is becoming increasingly aware of the deficiencies of the medical services, which do not allow of a full application of modern medical science to the prevention and cure of ill health. Further, many doctors are coming to realise that their working conditions hinder professional efficiency.

The proposals of the Beveridge report have offered to our profession great opportunities to contribute to social progress, which it has not yet seized. The proposals of the annual representative meeting, indeed, are likely to impede rather than be a step towards the comprehensive health service promised by the Government. The decisions of the ARM have not been well received by the public, and the continuation of an unhelpful attitude on our part must inevitably injure the status of the profession.

In the absence of the white-paper the ARM discussions this year had an unreal quality. There is ample evidence that if and when positive and progressive proposals are actually put before the profession by the Government, there are sufficient medical men to ensure that these proposals receive careful and sympathetic consideration and to coöperate in working a progressive scheme.

The signatories therefore urge the Government to produce without delay the promised white-paper, which they are confident cannot but provide a true implementation of Assumption B in all its aspects. They hope that those who hold similar views will be encouraged by this letter to join them in expressing their support of this view.

238 MEMBERS OF THE BMA.

The names appended to this letter are :—

Grace J. Adam; Robert Adam; Alice Akred; M. S. Aldridge, M. B. Alexander; T. H. Almond; D. Arning; O. F. H. Atkey.

E. T. Bailey; J. Shackleton Bailey; J. B. Bairds; F. Balkwill; G. Barasi; M. L. Barst; John Bee; A. C. Belfield; R. H. Bembridge; T. H. C. Benians; Ruth Bensusan-Butt; J. Bentinck; C. A. Birch; George Black; D. G. de Bouk; Brian Boyd-Cooper; D. S. Brian-Brown; G. Brown; E. Vipont Brown; Harold Buckley; Clifford F. Bullend; O. Bulloch; A. C. S. Burch; H. H. Bradley.

A. N. Cameron; Esther Carling; H. E. Carmalt; W. Chadwick; A. J. Clarke; T. M. Cole; S. Cochrane; W. A. L. Collier; V. L. Collins; W. F. Cooper; B. Couts; J. H. Crawford; Georgette Crosby; C. K. Cullen; W. E. Chiesman.

John Davenport; Ann Davies; James P. Davies; J. O. F. Davies; A. W. Davison; L. F. Delany; W. Pointon Dick; D. Lawson Dodd; E. G. Dolton; T. E. Dorran; Frances Drew; Margaret Duncan; James Dunlop; M. H. Dyson.

N. B. Eastwood; I. Eban; A. M. Edwards; Gilbert Elliott; I. J. Eppell.

J. L. Farquharson; J. Faulkner; Nancie Faux; J. Fettes; J. Fielding; J. Fieldman; L. Fieldman; Samuel Fine; Mary Fisher; P. Fourman; W. W. Fox; T. L. Frank; L. M. Franklin; C. Fraser; Y. Friedl; I. Frost; L. S. Fry.

H. Gainsborough; Patricia Gairdner; G. H. Gange; B. Gans; J. A. Gillison; H. M. Glover; W. N. Goldsmith; M. Gordon; T. Garland; Martin A. Goodwin; S. Gottlieb; G. M. Gray; L. M. Green; F. D. Griffiths.

A. Hancock; B. M. Hearty; C. P. Hearty; Dora M. Hill; W. Hinds; B. Hirsh; S. Hodgson; R. G. S. Howe; S. R. Hulton; J. H. Humphrey.

P. Inwald.

M. Jacob; A. L. Jacobs; A. S. Jarman; T. Francis Jarman; M. B. Jay; E. Clifford Jones; J. C. Jones; H. Joules.

P. Kaplin; S. Kaye; I. J. Keidan; E. F. Kelly; E. Kerner; P. Kidd; E. W. Kirk; T. H. Kirk; Brian Kirman; B. Klempamn.

Norman Lawrie; V. W. Lees; S. Leff; J. G. L'Etang; Harold Lewis; J. Liddell; S. J. Lipetz; F. J. G. Lishman; R. C. Lowe; F. M. Lucas; G. R. W. M. Luntz; R. A. Lyster.

Alison MacBeth; C. MacDonald; B. C. Macirone; A. E. McCandless; Donald Macleod; A. R. McGregor; James McNabb; H. H. MacWilliam; Joan Malleson; R. A. Manclark; M. Marcus; L. M. Masterman; G. H. Miles; E. H. M. Milligan; E. Minalt; D. A. Mitcheson; L. J. Moir; E. Montuschi; H. Munro; D. Munro-Ashman; J. J. Murnane; A. L. M. Morrison.

W. D. Newcomb; Peter Nash; M. Newfield; Edmund I. Newman; N. Newman; R. Nuki.

S. O'Boyle; Greta Olsson; G. M. Osborne; R. L. Osmaston; James O'Connor.

Joseph Parness; J. F. Payan; Mary E. Pearce; B. Perchman; A. Phillips; L. Phillips; M. R. Pollock; H. W. Pooler; R. Poots; Janet Posner; J. Powell-Evans; J. D. Proctor; D. M. Pryce; Anthony W. Purdie; R. F. Price.

R. H. Rankin; Alexander Reid; M. P. Rhodes; J. Robinson; H. D. Rosenberg; J. Ross; Kathleen Rutherford; V. C. Robinson.

R. Schultz; F. E. T. Scott; J. A. Scott; C. I. Schiff; R. P. W. Shackleton; W. J. Sheehan; A. I. Silverman; B. Singh; F. E. Smith; S. Smith; D. H. Smyth; E. Snell; Arnold Sorsby; Max Sorsby; M. Stein; Wm. Stott; J. Mitchell Stuart; Barnet Stross; H. W. Swann; F. A. H. Simmonds.

E. N. Taffs; F. Taylor; Evelyn Terry; M. D. Thakore; Felix F. Tietze; O. F. Thomas; R. H. Toothill; D. M. Trice; P. Tyrer; S. M. R. Thomson.

C. K. Vartan; M. Le Vay; Noel Vinter; H. E. Vickers.

M. Wayne; David Waxman; E. Westerlow; Joyce M. Wigram; E. A. Worley; R. R. Wilson; John Winning; A. H. Wortman.

P. Yarrow; S. L. Yates.

RETREAT TO 1938

SIR,—We wish to record our profound disappointment with the decisions taken at the Annual Representative Meeting of the British Medical Association. We had hoped that the ARM would reaffirm its support for a national medical service to cover 100% of the population and that it would develop its 1942 proposals for health centres. Instead of that, we have to witness a retreat from the progressive decisions of 1942 to the timid and out-of-date proposals of 1938. The BMA has taken one step forward and two steps back.

The recommendation for a two-way extension of the panel system would seem to preserve the evils both of crowded panel practice and competitive private practice, while the recommendation that the development of health centre practice should wait until experimental centres have been tried out may result in indefinite postponement.

We would urge the council of the BMA to reconsider their timid programme not in terms of prewar 1938, but in the light of present aspirations and postwar opportunities. The medical profession resisted the introduction of National Health Insurance in 1911. Today it appears that our biggest organisation, the BMA, may resist the introduction of a comprehensive medical service as required for the Beveridge plan of social security. Are we as a profession, to be blamed for trying to put the clock back twice in a generation?

T. H. ALMOND.
M. ATKIN.
C. H. BÖSENBERG.
UNA M. CAMPBELL.
BALBINA DROLLER.
M. MIDDLETON.
JOHN PEMBERTON.
A. SMITH.
H. J. WHITELEY.
ANDREW WILSON.
F. R. ZADIK.

Sheffield.

MEMORIAL TO PROF. WARRINGTON YORKE.—The council of the Liverpool School of Tropical Medicine is to use Sir Robert Rankin's gift of £500 to commemorate the scientific work of the late Prof. Warrington Yorke. They will award a memorial medal twice yearly on the result of the examinations held for the diploma in tropical hygiene.

Captain Edward Raymond Stone, MD, Washington, RAMC, was posted as killed last March (*Lancet*, 1943, i, 448). But we are glad to learn that his English namesake, Captain Ernest Richard Stone, MB CAMB, RAMC, of Coulsdon, Surrey, is alive and well.

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Obituary

CECIL ROWNTREE

MB LOND, F R C S

UNTIL illness stopped his work two years ago, Cecil Rowntree had a large surgical practice in and around London. He was widely esteemed and widely liked, and he used his talents unsparingly in the campaign against cancer.

His father, W. G. Rowntree, was a London practitioner, and he was educated at University College and the Middlesex Hospital. He was well equipped in body, intellect and imagination, and by hard work he gained his surgical fellowship early and became surgical registrar at his own hospital. A gay courageous fighter to the end of his life, he began his fighting career (writes a friend) when on a matter of principle he took a decision which closed the door to quick security and higher appointment. "From then onwards principle and loyalty always came before expediency and personal advantage: he never compromised. He fought for reforms and innovations in all branches of our profession, and was ever ready for change. A rut to him was a grave without the ends. Later in life he expressed himself well pleased with his early choice, because of the friendships, the opportunities and the work it had brought."

Apart from a period of service in the RAMC during the war of 1914–18, this work chiefly revolved round the Royal Cancer Hospital, of which he became senior surgeon, the Dreadnought and Woolwich Memorial Hospitals and the cottage hospitals at Caterham and East Grinstead. Rowntree was a good technician and a dexterous surgeon. He began practice at a time when it was customary to operate on private patients in their homes or in poorly equipped nursing-homes, and he became inured to difficulties; indeed, he liked to work on his own and until later years often operated with only the theatre sister to assist him. The patient always came first in his mind, and he was a pioneer in the use of premedication. Considerate and charming, he made his assistants and his patients into friends. "To him the man was greater than his accomplishment and the sick more important than the sickness." He always listened attentively to the views of younger men and tried to help them. Though he was best known as expert on cancer —especially perhaps cancer of the breast—and he did much to develop the present technique of radium therapy, it was in the wider scope of general surgery that his ideas found full play, and those whom he taught have much to remember him by.

From the launching of the British Empire Cancer Campaign Rowntree was associated with it as representative of the Cancer Hospital. Until two years ago he was deputy chairman of the executive; and as a committee-man he was invaluable. Whatever he said commanded attention because of his thorough knowledge and lucidity, and his tactful way of dealing with difficulties made him an asset in council or on deputation. He did much to steer the Campaign through its years of infancy and bring it to its present assured position. He was also vice-president, and a member of the executive, of the Union Internationale contre le Cancer.

An athlete in his youth, he was a tall, handsome man, of commanding presence both in the theatre and outside it. His yellow Rolls-Royce car—he had the same chauffeur from the beginning—was long a familiar sight, and on social occasions he showed himself one of the best after-dinner speakers in the profession; he could always be relied on for a good and witty speech that was neither too long nor too short. With his wife he made a home which friends were eager to enter and left inspired. Despite all preoccupations, he insisted on finding time to build up a friendship with his children and to plan and guide their lives and education. He leaves two sons and a daughter. His death on Oct. 14 ended four years of wearisome ill health, from which he knew there could be no recovery; but his friends felt that the victory lay with him.

ANDREW JAMES CAIRD

B SC, M B EDIN, F R C S E

Mr. Caird of Carlisle died at Edinburgh on Oct. 11 at the age of 52. He was an able, active and versatile man, whose death will be widely regretted.

Son of the Rev. David Caird, he was born at Perth and educated at the Perth Academy where he was dux. He graduated in arts and science at Edinburgh before taking his MB in 1916, and he gained many students' prizes. Joining the RAMC, he was soon sent to Salonika, and he worked for a year on the rehabilitation of orthopædic and other surgical cases at a convalescent camp. On being invalided home in July, 1918, he continued this interest at Shepherd's Bush under Sir Robert Jones, and also served at the Edinburgh war hospital under Sir Harold Stiles. On demobilisation he became tutor in clinical surgery at the Royal Infirmary and demonstrator in anatomy. His association with Carlisle began in 1920 with a post under the Ministry of Pensions, and three years afterwards he was elected to the staff of the Cumberland Infirmary. Later appointments included those of surgeon to the Carlisle Dispensary, consulting surgeon to Cockermouth Cottage Hospital and the City General Hospital, and orthopædic surgeon to the Carlisle Cripple Clinic.

Outside surgery Caird gave much time and thought to schemes for the welfare of young people, especially in connexion with the Boy's Brigade and the Air Training Corps. Like his father he was a Congregationalist, and he became president of the Congregational Union of the North of England. He wrote verse; his etchings and water-colours were exhibited at the Royal Scottish Academy and elsewhere; and he enjoyed gardening and fishing. He lately lost his eldest son, who was serving in the Royal Air Force, and Mrs. Caird is left with two younger sons.

STEPHEN THOMAS FALLA

M D LOND, M R C P

NEWS of the death of Stephen Falla on Sept. 16 comes from the Middle East where he was serving as a medical specialist. He was 33 years of age, and son of the late Alfred Falla of Guernsey. He qualified in 1933 from the London Hospital, where he was emergency officer before going to the Brompton Hospital as house-physician. He was also house-physician at the Royal Free and resident medical officer at the Royal Masonic Hospital. In 1937 he was elected physician to the Norfolk and Norwich Hospital and assistant physician to the Jenny Lind Hospital for Children. His experience at the Brompton had given him a special interest in chests, but his outlook was broad and in particular he became an adept with the gastroscope. He showed both promise and charm. "He was keen and conscientious" writes a colleague, "in all that he undertook to do," and "his enjoyment of life endeared him to many." He loved music and sailing, and he was an ardent and strong swimmer.

Falla was hon. secretary of the Norfolk and Norwich Medico-Chirurgical Society, and when war broke out he organised a blood-transfusion service for the county and city. Two years ago he joined the RAMC, in which he held the rank of major. He was working in a base hospital MEF, and lost his life while bathing.

EDWARD HENRY ALLON PASK

M D LOND

Dr. Allon Pask, medical superintendent of the Wrightington Hospital and a consultant tuberculosis officer of the Lancashire county council, died on Oct. 4 at his home on the hospital estate. He was born at Worksop in 1884, graduated in medicine at Sheffield, and later took London degrees. After 15 months of house appointments at the Sheffield Royal Infirmary and a period of private practice he entered the Colonial Service and was posted to Nyasaland, where medicine was tempered with big-game shooting. He then returned to the Sheffield

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Royal Infirmary and became senior house-physician and resident surgical officer. After a term at North St. Pancras Infirmary as assistant medical superintendent, he finally entered the tuberculosis service, beginning as assistant to the late G. B. Dixon at the Birmingham Tuberculosis Dispensary and Yardley Road Sanatorium. This was during the period of "mass" inoculation of tuberculin, about the time when the National Insurance Act came into force. Later he became medical superintendent of the Salterley Grange Sanatorium, near Cheltenham, where his chairman was Neville Chamberlain. In 1913 he entered the service of the Lancashire County Council and was engaged in dispensary work till the outbreak of the late war, when he joined the Forces, returning in 1916 to become the first medical superintendent of High Carley Sanatorium, near Ulverston. In 1931 he was promoted to the newly built Wrightington Hospital for non-pulmonary tuberculosis (226 beds), and his responsibilities there were much increased by the construction of an EMS Hospital (252 beds) during the present war. He was also responsible for the dispensary work in the surrounding Wigan county area, with a population of 105,000.

In 1930 Pask went to Canada and the United States with the party of British tuberculosis officers. He also undertook, at the request of the Ministry of Health, an investigation in Germany into the merits of Gerson's salt-free diet. He was both a good administrator and a good clinician: urbane, thorough and competent, he earned the confidence, respect and affection of his colleagues. He leaves a widow.

VICTOR VARTAN MUIR

M B EDIN

Dr. Victor Muir was lost at sea during July when the ship in which he was returning to Nigeria was sunk by enemy action. He was the son of Dr. Ernest Muir, medical secretary of the British Empire Leprosy Relief Association who is at present in charge of the Leprosarium in Trinidad. Victor Muir was educated at George Watson's College, Edinburgh, and graduated in medicine from the University of Edinburgh in 1939. The following year he took the diploma of tropical medicine and hygiene and entered the Colonial Medical Service. After holding a house-appointment at the Edinburgh Royal Infirmary he was posted to Nigeria in October, 1940. He returned to this country in March of this year and during his leave passed the clinical examination for his MD. He leaves a widow.

Infectious Disease in England and Wales

WEEK ENDED OCT. 16

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 3324; whooping-cough, 1482; diphtheria, 707; paratyphoid, 3; typhoid, 5; measles (excluding rubella), 675; pneumonia (primary or influenzal), 569; puerperal pyrexia, 153; cerebrospinal fever, 37; poliomyelitis, 19; polio-encephalitis, 0; encephalitis lethargica, 5; dysentery, 253; ophthalmia neonatorum, 87. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Oct. 13 was 2029. During the previous week the following cases were admitted: scarlet fever, 254; diphtheria, 50; measles, 15; whooping-cough, 43.

Deaths.—In 126 great towns there were no deaths from enteric fever, 2 (0) from measles, 2 (0) from scarlet fever, 6 (0) from whooping-cough, 7 (0) from diphtheria, 58 (10) from diarrhœa and enteritis under two years, and 18 (5) from influenza. The figures in parentheses are those for London itself.

Liverpool and Birmingham each reported 8 deaths from diarrhœa. There were 3 fatal cases of diphtheria at Wolverhampton.

The number of stillbirths notified during the week was 232 (corresponding to a rate of 35 per thousand total births), including 19 in London.

Notes and News

NEWS FROM CHINA

IT is with pleasure that we welcome the reappearance of the *Chinese Medical Journal*, whose publication was suspended in December, 1941, owing to the occupation of the Chinese Medical Association's offices by the Japanese. Wartime conditions made it impossible to obtain the necessary printing facilities for such a journal in free China, but through the generosity of the China Foundation of the USA an office has been opened in Washington (the address of which is PO Box 6096), and the first number issued from there. It is proposed to continue publication from America quarterly until the end of the war, a medical digest being at the same time issued in the Chinese language from Chungking, in place of the former *National Medical Journal*.

The new journal is edited by Dr. J. Heng Liu and Dr. Szeming Sze (the latter will be remembered by many former friends and associates at Cambridge and St. Thomas's), and contains many valuable articles and reports related to health conditions and medical services in China under the stress of wear. They include accounts of typhus fever in Kunming and Shanghai, subtertian malaria in Yunnan, the present status of malaria in free China, and epidemic prevention and control. This last article, which has particular reference to outbreaks of plague and cholera, contains a description of the activities of the Weishengshu Anti-epidemic Corps, which, working from headquarters in Chungking, provides mobile units for despatch to any area in which an outbreak occurs. In one year this corps participated in the control of plague in Fukien, Chekiang, Kiangsi and Hunan; of cholera in seven other provinces; of typhus and relapsing fever in Hupeh and Honan; and of various epidemics of meningitis, malaria and smallpox. During this period they administered nearly 600,000 preventive inoculations and carried out widespread measures of investigation and disinfestation.

In connexion with one epidemic of bubonic plague—at Changteh, in November, 1941—a fact is recorded which raises the possibility of enemy action as an instrument in spreading bacterial war. It is stated that a few days before the outbreak, Japanese planes appeared over the city, dropping packets of grain and rags, and it was in the very districts in which these strange parcels were delivered in this unusual fashion that the epidemic first made its appearance. Dr. R. Pollitzer, epidemiologist of the National Health Administration, who investigated the incident, believed that plague-infected fleas had been embedded in the grain and rags, and that they thus spread to the rats of the neighbourhood.

The journal contains news of various agencies and relief organisations working in, or on behalf, of China during the war, and it is noteworthy that the Henry Lester Institute of Medical Research is still functioning, though under a Japanese director. We regret to hear that the Peking Union Medical College and Hospital, with their magnificent buildings and equipment, have all been seized by the Japanese, the college closed, and the former director, Dr. H. S. Houghton, interned.

IN the Students' Guide (*Lancet*, Aug. 28, p. 269) the Prince of Wales's General Hospital was erroneously placed among the hospitals of group B. These are hospitals which as a result of bomb damage or for other war reasons can offer only outpatient teaching. Actually the North-East London Postgraduate College of the Prince of Wales's Hospital is once more offering teaching almost of prewar scope. In-patients, outpatients and special departments are all open to postgraduates, and clinical demonstrations, ward rounds and lectures have been arranged both there and at allied hospitals. The special departments give experience in allergy, eye and ear diseases, skins, fractures, genito-urinary and gynæcological conditions, neurology, pædiatrics, psychiatry, physiotherapy and dental work. The Middlesex County Council centre for the treatment of venereal diseases is also held at the hospital. Instruction is given in administration of anæsthetics and courses in infectious fevers and psychological medicine can be arranged at associated hospitals. The North Middlesex, with 1000 beds, is among the hospitals collaborating in teaching. The college is recognised by the University of London as a place for postgraduate study for the MD and MS degrees and for diplomas in child health and anæsthetics. Doctors practising in the neighbourhood are invited to become members and special arrangements are made for their attendance at lectures and clinics—a method of making the teaching hospital the centre of local medical life and interest which might be copied elsewhere.

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University of Oxford

In a congregation held on Oct. 14, the following degrees were conferred:

BM, BCh—Thomas Stapleton (in person); G. F. Bader, T. E. S. Stowell, A. J. Watkin, C. E. Davies, Helen M. C. Morley (in absence).

Theodore Williams Scholarship.—An examination for this scholarship will be held in the Sir William Dunn School of Pathology on Wednesday, Nov. 17, at 2 PM. The scholarship is open to any member of the university, who on June 30, 1943, had not exceeded twenty-six years of age and had attended a course in general pathology and bacteriology in the school either in 1942–43 or 1941–42. Candidates should inform the Professor of Pathology before Nov. 13.

University of Cambridge

On Oct. 15 the following degrees were conferred:

MD.—M. J. Clow and A. L. Fawdry (by proxy); H. L. Hoffman and B. L. F. Heydon.

MB, B Chir.—M. C. Cross, Peter Unwin, M. M. Walker, P. A. O. Wilson, A. J. Gray, E. N. M. Johnston, D. C. Sturdy, J. L. S. Smith, P. R. Swyer, C. O. Edwards and A. I. MacLeod (by proxy); and W. V. Bowman.

MB.—J. L. Potts and G. H. Ward (by proxy).

Royal College of Surgeons of Edinburgh

At a meeting of the college held on Oct. 20, the following office-bearers were elected for the ensuing year:

President, Prof. R. W. Johnstone; vice-president, Mr. J. W. Struthers; secretary and treasurer, Mr. K. Paterson Brown; members of President's Council, Mr. James Graham, Sir John Fraser, Mr. A. Pirie Watson, Dr. G. Ewart Martin, Mr. Francis Jardine, and Mr. W. Quarry Wood; representative on the General Medical Council, Mr. Henry Wade; convenor of museum committee, Mr. W. Quarry Wood; and librarian, Dr. Douglas Guthrie.

The following were elected to the fellowship:

William Cowell, MB DURH; Evan Griffiths, MB LOND; W. G. Holdsworth, MB MKLB.; A. M. Howard, MRCS; S. L. Mann, MB GLASG; A. G. C. Neill, MB EDIN; St. J. G. O'Connell, MB NUI; C. C. Slack, MB LPOOL; and H. B. Young, MB GLASG.

Medical Casualties

The following casualties have been announced recently:

Killed.—Captain H. G. Greeves, MB BELF., RAMC.

Missing, presumed killed.—Surgeon Lieutenant P. H. Colver, MB BIRM., RNVR.

Wounded.—Captain J. H. F. Brotherston, MB EDIN., RAMC.

Prisoners of War in Japanese hands.—Flight-Lieutenant R. A. Cumming, MB ABERD., RAFVR, Flight-Lieutenant A. N. H. Peach, MB BRIST., RAFVR; and Flight-Lieutenant W. N. Riley, MRCS, RAFVR.

Four Years' Plan for Children's Nurseries

The Minister of Health has received a deputation from the National Society of Children's Nurseries on its four years' plan for nursery development after the war. The deputation was headed by the chairman, Major C. H. Nathan, and included Lady Gunston, Mrs. W. H. Norton, Sir Bruce Bruce-Porter, Dr. Björkegren, Dr. Ursula Shelley, Miss Evelyn Pantin, Miss Alma Fox and Mrs. F. V. Enthoven. Mr. Brown promised to give full consideration to the society's representations for postwar nurseries on an extended scale.

Royal Society of Medicine

On Tuesday, Nov. 2, at 2 PM, Mr. S. A. S. Malkin will deliver his presidential address to the section of orthopædics on the contribution of orthopædic surgery to hospital development. Afterwards Major R. Soto-Hall, USAMC, will speak on the training of an orthopædic surgeon in the USA, and Prof. Harry Platt on orthopædic surgery and the future. The section of pathology will meet on the same day at 4 PM, and there will be a general meeting of fellows of the society at 4.30 PM. At the section of history of medicine on Nov. 3, at 2.30 PM, Dr. E. Ashworth Underwood will read a paper on Antoine Lavoisier and his predecessors in the field of respiration and metabolism. On the same day, at 5 PM, Sir James Walton will give his presidential address to the section of surgery. He is to speak on injuries to the common bile-duct and Surgeon Rear-Admiral G. Gordon-Taylor, Prof. G. Grey Turner and Dr. E. R. Flint will open the discussion which is to follow. On Nov. 5, at 10.30 AM, Mr. T. B. Jobson is to give his presidential address on the audibility of the radio voice and the discussion will be opened by Mr. John Snagge and Mr. W. M. Mollison. At the section of anæsthetics at 2.30 PM on the same day Squadron-Leader B. G. B. Lucas will read a paper on pulmonary complications following simple hernia operations. The section of laryngology is meeting at the same hour when Mr. Mollison is giving his presidential address on pain in laryngology. Afterwards Dr. Wilfred Harris, Captain A. G. M. Weddell and Mr. C. P. Wilson are to open the discussion.

British Social Hygiene Council

On Monday, Nov. 1, at 3.30 PM, Sir Walter Langdon-Brown, the president of the council, is to give an address on social biology and planning. The meeting will be held at BMA House, Tavistock Square, London, W.C. 1.

Bristol Merger

The committee of management of the Bristol Aeroplane Company Employees Hospital Fund and the council of the Bristol Hospitals Fund (Inc.) have agreed (subject to ratification in accordance with their existing constitutions) to combine and merge their funds and interests and to set up a new amalgamated fund. The governing body of the new fund will consist of the following representatives: 25 employee contributors, 5 employer contributors, 2 from the Bristol and District Divisional Hospitals Council, 7 from voluntary hospitals, 2 from medical staffs, the chairman of the Bristol health committee, the Bristol MOH, 2 from the University of Bristol, 2 from the Bristol Trades and Labour Council, and 1 from the Bristol panel and local medical committee.

Medical Honours

The following awards have been made to medical officers:

OBE (military division).—Lieut.-Colonel H. W. Farrell, FRCSE, IMS.

DSC.—Surgeon Lieutenant M. J. Hood, MB GLASG., RNVR.

Hood was serving in a destroyer. While she was on convoy escort duty last winter a signal was received from another escort ship asking for medical attention for injured men. Icing conditions made it impossible to get seaboats away and the only alternative was for one ship to go alongside the other. This was achieved, but owing to the wind and swell it was dangerous for both ships to remain together for more than a matter of seconds. As the vessels, both of which were covered in ice, closed, Hood jumped from one ship to the other. One slip might have cost him his own life. Then for 30 hours he worked unceasingly among the wounded. His operating-table was the table of the seamen's mess-deck, and to help him to keep a steady hand as the ship pitched and rolled, two ratings supported the doctor as he worked.

Appointments

CONNELL, J. S. M., FRCSE: surgeon to the gynæcological department of the Walsall General Hospital.

BRAMWELL, B. R., MD MANC., MRCP: medical referee for the county-court districts of Downham Market, East Dereham, Fakenham, Holt, King's Lynn, North Walsham, Norwich, Swaffham, Thetford and Wymondham (circuit No. 32).

JONES, A. M., MRCS: medical referee for the county-court districts of Bangor, Conway, Llandudno and Colwyn Bay; and Llanrwst.

TERRY, ELSIE M., MD LOND.: asst. surgeon to the gynæcological department of the Walsall General Hospital.

WALKER, M. M., MRCS: asst. M.O in Kingston Public Hospital, Jamaica.

Births, Marriages and Deaths

BIRTHS

BOWEN.—On Oct. 17, at Barry, Glam., the wife of Mr. J. Glyn Bowen, FRCS—a daughter.

ILES.—On Oct. 15, at Cairo, the wife of Major J. D. H. Iles, RAMC, of Starcross, Devon—a son.

JACKSON.—On Oct. 14, at Oxford, the wife of Lieutenant C. R. S. Jackson, RAMC—twin sons.

LANGMEAD.—On Oct. 22, the wife of Dr. L. B. Langmead, of Tunbridge Wells—a son.

MALING.—On Oct. 22, at Kew, the wife of Lieutenant P. B. Maling, GM., RAMC—a son.

MARRIAGES

DAWSON—HOGG.—On Oct. 23, in London, William Watson Dawson, MB, of Wantage, Berks. to Josephine Stuart Hogg.

PAYNE—LOVELACE.—On Oct. 16, at Chichester, Cyril Ernest Reginald Payne, surgeon lieutenant, RNVR, to Mary Lovelace, of Claygate, Surrey.

TATTERSALL—TOWNEND.—On Oct. 16, at Chiswick, William Horrocks Tattersall, MB, of Blackburn, to Joan Novello Townend.

WATERS—BLYTON.—On Oct. 20, Kenneth Fraser Darrell Waters, FRCSE, to Enid Blyton.

WILLINGTON—MATHEWS.—On Oct. 11, in Dublin, Frederick Lane Willington, major RAMC, to Joan Mathews.

WILLMOTT—MANSFIELD.—On Oct. 20, at Cambridge, Leslie Arthur Willmott, captain RAMC, retd, to Helen Mary Mansfield.

DEATHS

BATTEN.—On Oct. 22, at Hampstead, Rayner Derry Batten, MD LOND., aged 85.

JONES.—On Oct. 21, at Bath, Philip Theodosius Jones, MRCS.

MANN.—On Oct. 22, Fairman Rackham Mann, MRCS, surgeon commander, RN retd, of Tasburgh, Norwich.

PRITCHARD.—On Oct. 20, at Exmouth, Eric Pritchard, MD OXFD, FRCP.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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TREATMENT AND THE PATIENT

LESLIE COLE, MD CAMB., FRCP
PHYSICIAN TO ADDENBROOKE'S HOSPITAL, CAMBRIDGE

IT has been said that "The first part of treatment is diagnosis, and the second, diagnosis, and the third, diagnosis"—an overstatement which expresses a great truth but is sometimes taken too literally. It is true that right treatment must be based on correct diagnosis, but it does not in the least follow that the best treatment follows automatically.

In a previous paper[1] I tried to show how every step in diagnosis is a part of treatment (because the manner in which each step is managed is liable to influence a patient's attitude to his disease) and then to consider how far diagnostic methods are rightly applied today. I propose here to pursue my inquiry further and to consider in what essentials of treatment mistakes are often made. I attempt this with the full realisation that there are many who do not make these mistakes, that to generalise on such a subject is dangerous and that there is hardly any rule pertaining to it which cannot be justifiably broken on occasion.

SENDING PATIENTS TO BED

Some doctors spend their lives sending patients to bed and by the zeal and energy which they devote to it establish unshakable reputations for prudence. But bed is such a dangerous place for the aged, and so irksome for the young, that it is worth discussing some of its pros and cons.

It is wise to send a patient to bed when he has a temperature, a general infection even if the temperature is normal, a local infection of more than a certain degree of severity; when there is severe under-nutrition; when the work of the heart, lungs, kidneys or other organs needs to be reduced to a minimum, and when injuries either external or internal have to be healed. Bed is also useful as means of securing physical and mental isolation and rest and for observation when a case is undiagnosed.

The disadvantages of prolonged rest in bed are considerable and increase with weight and age. Skeletal muscles grow weak and lose their tone, the quickness and efficiency of occupational reflexes is impaired and circulatory efficiency is diminished so that the power to do physical work is temporarily limited. In patients with a tendency to fibrositis or arthritis, fascial sheaths adhere and joints stiffen. If for any reason the chest is immobilised there is a risk of hypostatic pneumonia. The slowing of the circulation, particularly if there is an infection, predisposes to thromboses and prolonged recumbency to bedsores. Stasis is produced in internal organs with resulting constipation, deposit of urinary crystals and formation of calculi in the urinary and biliary tracts. In some people rest in bed leads to a steady increase in weight when it is least wanted and this in itself is a great handicap later in many ways. Finally, prolonged rest in bed may lower morale and in some produces morbid anxiety.

When sending patients to bed these pros and cons should be carefully weighed, particularly in regard to each patient's character, temperament and constitution as well as to the disease he is suffering from. Prolonged and complete immobilisation should always be avoided if the disease allows it, and full movements of joints, changes of posture and deep breathing systematised daily. This is particularly desirable in old people and those who are physically sluggish, and before sending such completely to bed it is well to consider whether an equally good result cannot be obtained by restriction rather than complete curtailment of effort. This is not to say that prolonged rest in bed is not often necessary and desirable, but to emphasise disadvantages which are often forgotten and which can be avoided if remembered.

There is another aspect of sending patients to bed which is sometimes at the back of the doctor's mind, and that is that death in bed reflects more credit on his judgment than death in harness. To die boarding a tram while under medical treatment is in a sense the medical equivalent of death on the table. Both are to be avoided as far as possible, but by excessive caution too high a price can be paid. Many patients, particularly old people, probably live longer, and certainly more happily, if they are encouraged to be active to the end of their lives.

GETTING PATIENTS UP AGAIN: CONVALESCENCE

The return to normal life after severe illness should be a graded systematised process regulated by the physical and temperamental response to each increase in effort. If progress is pushed too fast there is a risk of physical exhaustion and the disappointment and discouragement which accompanies this. On the other hand too timid an advance carries with it an at least equal risk of prolonged feebleness and unnecessarily delayed recovery. The ability to choose the right course between these extremes is a quality in the doctor which helps to prevent anxiety neuroses after a long illness. Every patient presents such an individual problem that rules of procedure to elaborate the above principles are less useful than most generalisations. Generally speaking patients are kept completely in bed for too high a proportion of the total time they are off work, they are too inactive in bed during the period before they begin to get up, and the transition from complete rest to activity is too sudden. When they get up their progress should be regulated according to plan, so that they are educated gradually to the degree of effort they will need when they start work again. During this stage of the illness considerably more supervision and direction by the doctor may be needed than in earlier stages when complete rest is unavoidable.

Much chronic ill health following an illness is due to anxiety which prolonged rest in itself tends to foster. During this war it has been more clearly recognised that prolonged rest in conditions such as chronic headache and giddiness following head injury, chronic dyspepsia and effort syndrome do more harm than good and that *speed* and accuracy in diagnosis are important to kill anxieties before they can germinate. After a severe illness anxieties can often be prevented if care is taken to warn patients what they may expect during convalescence. If a patient is warned that he may feel weak when he first gets up he is pleased and encouraged when he does not and takes it as a matter of course when he does. If he is primed with false optimism, depression and a sense of failure follow. It is at this stage in an illness that the doctor's confidence in himself, based on accurate diagnosis and prognosis, is so valuable to the patient.

There is one troublesome and delaying sign after an illness which is worth separate mention because it so often delays progress, and that is the temperature that will not quite settle. In assessing the meaning of this the sedimentation-rate is a useful ancillary which might be used in general practice more than it is.

DIET

There are many traditions and taboos about diet which need careful re-examination. Some rule-of-thumb dieting does more harm than good and the aims of other regimes are difficult to fathom. Many complicated diets do good because they reduce weight rather than because they correct the complex metabolic abnormalities for which they are optimistically designed. To avoid unnecessary errors every diet should be reviewed from four points of view: completeness, energy value, idiosyncrasy and the way it is eaten.

Completeness.—Every special diet should contain all the essentials of a normal diet: vitamins, salts, proteins, fats, carbohydrates and water. In compensating for one abnormality it is important to avoid producing another—for example vitamin-C deficiency in a gastric ulcer diet.

Energy value.—This is perhaps the most important consideration because it is most often forgotten. The amount of food must be based on knowledge of the patient's occupation and habits, his actual weight as compared with his required weight, and how he *feels* after taking the diet for a trial period. Many patients who are given special diets, especially if the change is made suddenly and without regard to their previous habits, feel weak from lack of food. This is particularly the case in conditions like diabetes, nephritis and obesity.

1. *Lancet*, 1943, i, 163.

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Sudden drastic reduction of protein in conditions like chronic nephritis and arteriosclerosis is liable to produce a feeling of weakness in those who have previously eaten to excess. While excess should be avoided in such conditions there is no evidence that it does harm in strict moderation even in the form of red meat. Dieting to reduce weight has a wide application in many different conditions, but restrictions are often made too suddenly and drastically. If food is gradually cut down until the patient's weight shows a steady fall the diet has often only to be maintained at this level until the required weight has been reached. A somewhat fuller diet may then be allowed but it should be controlled by regular weighing of the patient. It is more important to weigh the patient than the diet. The present war has provided a mass experiment in weight reduction by diet and although there are other complicating factors and the experiment is not controlled, the effect on the health of the people, particularly the middle-aged and elderly, appears to have been good.

Idiosyncrasy.—Knowledge of intolerance to particular foods whether due to allergy or natural aversion can most easily be gained from the patient. These will be avoided if every new diet is based as it should be on a study of the old. This may also reveal increased tolerance to certain foods which may be useful.

The way food is eaten.—Many errors in diet are due not to quality and amount but to the way in which the food is eaten and the conditions under which it is served. Thus spacing and regularity of meals, time spent over them, excitement and work during meals, rush and hurry immediately afterwards and the regulation of smoking and alcohol need more attention. Often rearrangement of the day's routine rather than alteration of food is what is needed.

PURGING

The prevalence of "constipation" is due partly to a misconception of the term, so that anyone who does not toe the line with the rest in having a bowel action once daily is taught to regard himself as constipated, and partly to interference with the factors which produce regular action of the bowels. These are: roughage, plenty of drink, plenty of exercise, freedom of opportunity and freedom of posture in defæcating.

The diagnosis of constipation should be based on the individual's natural bowel action and this need not be a daily one. Mere regularity is not a reliable guide; the amount and consistency of the stools are important, and a feeling of well-being is most important of all.

In treating constipation the normal for the patient is the base-line which first has to be found. Any deviation from this should be corrected if possible by additional roughage, increase of fluid and exercise and establishment of habit which under civilised conditions must take the place of freedom of opportunity. Freedom of posture is more difficult to arrange outside camp, but the squatting posture—allowing of greater muscular effort with greater protection of hernial orifices—is important in developing the abdominal muscles. Only when such measures fail should purgatives be resorted to, and these should be as little irritating as possible and limited to the necessary minimum. What often happens is that the base-line is never established but treatment of "constipation" with purgatives, often drastic, is begun before it has ever been present, while lack of roughage, fluids and exercise is allowed to go unchecked. An irritated bowel results which to some becomes a focus of anxiety with further loss of mental health and physical efficiency.

BAD POSTURE

Bad posture is the cause of much ill health and ugliness and may in time affect every system of the body. To realise its prevalence it is only necessary to stand for a few minutes in a crowded street and watch the people. Poor chest expansion and incorrect breathing predispose to chest infections and indirectly to venous stasis and diminished circulatory efficiency because efficient respiratory movements help to return the blood to the heart. An upright carriage with free supple movements of the spine and limbs tends to prevent fibrositis in middle age and unhealthy deposition of fat—the whole vicious circle of increasing stiffness and obesity with diminishing activity and circulatory efficiency.

The importance of early recognition and correction of all postural abnormalities is as yet only realised and practised by the few. Students and many doctors tend to focus their examination on the heart, lungs, abdominal organs and nervous system at the expense of the skeletal and muscular systems: to look for murmurs without looking at the spine or watching to see how the patient stands, walks and breathes. The latter evidence considered in conjunction with occupation, habits and environment will give the answer to many clinical problems both of major and minor ill health. In any future policy of preventive medicine or "positive health" the diagnosis and early treatment of postural deformities should be given a prominent place, not only for young people but also for middle-aged and elderly.

As examples I will cite two specific conditions in which physical treatment should be used much more. Enlarged tonsils and adenoids are often associated, either as cause or effect, with mouth-breathing, poor chest expansion and postural defects. Operation, although it may lessen the tendency to frequent colds, does not automatically cure the secondary defects, and when these are present should always be followed by appropriate exercise to ensure that breathing and posture are at once corrected. Asthma also is commonly associated with faults of posture and breathing and their correction is nearly always an important adjunct to other treatment.

THE USE OF DRUGS

There are now a large number of drugs with powerful and specific bactericidal or pharmacological effects; and, given a correct diagnosis and knowledge of the special conditions under which they act, their use should be comparatively easy.

Consider the following five examples: iron in microcytic anæmia, liver extract in macrocytic anæmia, sulphapyridine in pneumonia, glyceryl trinitrate in angina pectoris and mersalyl in cardiac œdema. What are the main criteria with each for success? Iron should be given in large doses continued long enough to correct the anæmia: in certain patients it may be necessary to continue it at intervals. Liver extract should be given in doses large enough to restore the blood-picture to normal and then be continued, usually for life, in doses large enough to maintain it. When lobar pneumonia is diagnosed the appropriate amount of sulphapyridine should be concentrated over a week or ten days with the heaviest dosage at the beginning in order to knock out the infection before it has time to become resistant to the drug. Glyceryl trinitrate may be given not only for severe anginal pain but also at the slightest premonition of pain and even regularly as a prophylactic. Mersalyl may be given not only for gross cardiac œdema but to patients with threatening congestive failure in whom an increase of symptoms and an increase of weight herald a relapse. When a good response is obtained the drug may usually be given safely every three or four days until the œdema has disappeared completely.

All these drugs are used commonly in practice but often not to the best advantage. This is nearly always because either the dose is not large enough to begin with or is not continued long enough.

The practice of giving combinations of drugs, although not in itself bad, is liable to lead to inefficiency. For example, in a few patients a mixture of vitamins, iron and liver extract will have an optimum effect; but most require either iron *or* liver and the giving of combinations usually results in too small a dose of the one essential which is not compensated for by the other ingredients which are relatively or quite unnecessary. Another disadvantage of using combinations of drugs is that therapeutic effects are inevitably blurred because it is impossible to say which particular ingredient is responsible for the result. To avoid this confusion it is a wise working rule to determine each patient's response to a drug used alone, and once this has been established appropriate combinations may often be given.

A drug may be given for its specific effect when the diagnosis is certain or as a placebo in an undiagnosed illness, and between these two extremes are many shades and gradations. Some prescriptions are a queer mixture of science, empiricism, tradition and superstition. This is partly because a doctor is often expected to give or feels it is wise to give medicine when scientifically there

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is no indication for it. Economy of time is also a consideration, for advice plus medicine can usually be given more expeditiously than advice by itself. Thus the writing of a prescription may be in a sense an escape mechanism for the doctor.

When a drug is used the dose must be large enough. Morphine which fails to relieve pain or potassium citrate to make the urine alkaline are ineffective gestures which may do more harm than good. With dangerous drugs the effective dose cannot always be safely given at the outset because the individual patient's response is not known and the error if any must be on the safe side. The method of trial and error should then be applied until the safe and effective dose is found. It is sometimes forgotten that the official dose has got to be modified and the test of the right dose is whether it works.

When drugs are given for empirical or traditional reasons it is important for the doctor to be honest with himself and face the lack of facts. If he can do this his medicine will do him no harm and may still help his patient.

FOCAL SEPSIS

The discovery that some chronic diseases are caused by a localised focus of infection in such organs as the teeth, tonsils, nasal sinuses, urinary tract or gall bladder, and that they can sometimes be cured if this is eradicated, gave a new object for therapeutic effort. Hunting for a scapegoat has its charm and perhaps that is why this rational idea is sometimes pursued with such irrational enthusiasm. Now after twenty years it is easier to see how limited are the worth-while results obtained and what discomfort, pain and sometimes disaster result from ill-considered action in eradicating supposed septic foci. Medical opinion on this subject has veered to the right in the last few years but there is still a good deal of hit-or-miss treatment of suspected focal sepsis which does the patient more harm than good and might with greater consideration be avoided. To lay down general rules about the treatment of focal sepsis is difficult. When however a suspected focus is present an attempt to answer the following questions will help to prevent mistakes:

1. Is there any other more obvious cause which should be treated first?
2. Is there any time relationship between the onset of the local and the general infection which suggests an association between the two?
3. Does an exacerbation of the local infection cause any general effect?
4. Is either the local or general infection so chronic that it is unlikely that treatment of the former can effect the latter?
5. Is the local infection so severe or of such a nature that an attempt to eradicate it may do harm?
6. Is there any direct anatomical association between the two? (e.g., sinusitus and bronchiectasis).
7. Is the association merely accidental?
8. Is the patient's general condition such that the risk of local treatment may be out of proportion to possible benefit?

All these questions cannot be answered in every case, but if they are *considered* as a routine before any operation for focal sepsis much unnecessary suffering would be prevented.

DENTAL TREATMENT FOR GENERAL DISEASE

Among many possible sources of focal infection the teeth are often suspected and treated. In doing this their true function is often forgotten and mouths are cleared on a rather ill-founded hope of curing some general infection or vague ill health. Wholesale clearance of comparatively healthy mouths is to some extent forced on the doctor and dentist by social conditions; at present it is difficult for poor people to get false teeth except as a complete upper or lower set, so that all-or-none law as applied to teeth is a recognised tradition. Even allowing for financial limitations in securing adequate dental treatment, ill-advised dental extraction for general conditions is one of the bad features of medical treatment today.

The decision when to pull out teeth for a general infection is a dual one only properly made by coöperation between dentist and doctor. Dental efficiency and oral hygiene in themselves are mainly problems for the former; the effects of dental sepsis and deficiency on the general health, mainly for the latter; but the spheres of each overlap. I am only concerned with the doctor's part. To answer the question of when and what dental treatment is necessary the doctor should consider the questions already asked in relation to focal sepsis in general and also two further ones:

9. If extensive extractions seem necessary, what is likely to be the general effect on the patient?
10. Can satisfactory false teeth be provided either at once or later? (To be answered by the dentist.)

Often it is a choice between removing a few teeth only and leaving an inefficient set, or clearing a whole jaw with the prospect of a complete denture after several months.

Finally it is worth enumerating some of the general ill effects which may follow dental extraction such as:

1. Exacerbation of a local infection—e.g., fibrositis, arthritis.
2. Initiation of a general infection—e.g., infective endocarditis.
3. Aspiration effects—e.g., bronchopneumonia, bronchiectasis, lung abscess. (Usually after multiple extractions of septic teeth.)
4. Various forms of dyspepsia—e.g., exacerbation of a quiescent peptic ulcer. (From swallowed septic material or because from lack of teeth or inefficient dentures food cannot be properly masticated.)
5. Psychological effects from loss of teeth (and beauty in young women).

I do not wish to imply that any of the above are a common sequel to dental extraction but merely to review what as possibilities should be kept in mind—just as one keeps in mind the complications of scarlet fever or pneumonia. To do this will help to avoid them.

TREATMENT OF MULTIPLE CAUSES

As a diagnosis is complete and accurate only when it includes *all* the disorders which are present, so treatment will be the best only when all these are treated. In gross combinations of disease, such as cerebrospinal fever in a diabetic, treatment both by sulphapyridine and insulin is essential and the omission of either may mean death. Many patients however suffer from combinations of trouble which are less obvious, and sometimes there may be several major or minor treatable conditions, all contributing to a single syndrome in the same patient. Omission of treatment of only one of these may be responsible for total failure, the difference between returning to an active life or remaining an invalid.

Here are some more examples. Angina pectoris may be due in the main to coronary sclerosis, with anæmia, obesity and tobacco as contributory factors. Freedom from symptoms and a return to a useful life may be secured if the obesity is treated by a reducing diet, the anæmia cured by iron and smoking stopped. On these lines glyceryl trinitrate may be superfluous. On the other hand the use of glyceryl trinitrate alone without attention to the other three factors may give temporary and symptomatic relief only. Giddiness may be caused by a combination of eyestrain, anæmia, visceroptosis and constipation and may be relieved only when all these are treated; chronic bronchitis is often combined with chronic sinus infection, bad posture and breathing; and gastric ulcer with oral sepsis, dental deficiency and secondary anæmia. Varicose veins and piles are often associated with visceroptosis, constipation and obesity and to cure them it is not enough to inject the veins but it is necessary also to treat these other factors contributing to venous stasis. Many disabling symptoms are not due to serious organic disease but to a combination of slight abnormalities. Thus headache may be produced by the summation of eyestrain, oral sepsis, dyspepsia from an unsuitable diet, and the menopause.

A more obscure example of a single symptom produced by a double cause is seen in the sensitising effect of trauma on a particular part of the body. For example, after a head injury a chronic ear lesion which has previously been symptomless may give rise to pain and giddiness, or after laparotomy chronic constipation which has previously been painless may cause colonic pain. The trauma, perhaps by focusing attention on the particular part, lowers the threshold for pain so that stimuli which

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have hitherto passed unnoticed reach consciousness. It is important to recognise this double cause because a simple explanation to the patient will often cure when direct treatment of the symptom has failed.

These facts are well known but many failures occur because they are forgotten or ignored. To put them into practice a high standard of history-taking and systematic examination are essential and, as Sir Farquhar Buzzard [2] has pointed out, lack of time rather than lack of skill is often the cause of omissions. When one or two likely or probable causes of a symptom have been discovered the examination is not pursued; other contributory factors are missed and perhaps only looked for at a later examination when the patient comes back unrelieved. This method, although at times unavoidable, is bad; for it often means that cure is delayed because the first examination and treatment was incomplete.

EXPLAINING TO THE PATIENT

As many failures in treatment are due to the fact that significance of the results of elaborate investigations are not made clear to the patient, so treatment is not properly carried out because the simple ideas on which it is based are not clearly explained. Understanding is the basis of coöperation and without it much modern medical treatment is impossible. Failure to explain basic principles rather than detail is the commoner error, and indeed too much detail masks principle.

In most sections of the population peptic ulcers relapse not because patients cannot get the food ordered but because they have not been taught to eat it in the right way, under the right conditions at the right time. Diabetics develop coma or hypoglycæmia because they have not been taught or learned enough about the management of their disease. Those with pernicious anæmia relapse because they have not learned that they must never stop their injections of liver extract. Epileptics relapse because after a few weeks' freedom from fits they stop taking their phenobarbitone. These are some examples of failure in the technique of teaching the patient—failure to explain in simple terms why certain things should always be done, and the results likely to follow if they are not. Almost every practising doctor would admit the truth of this but what is not appreciated to the extent of putting it into general practice is the extreme importance, not merely of telling but of teaching the patient how to look after his own health. In many cases the final result depends not on whether the doctor knows the right treatment but on his power of teaching his patient to carry it out. It is no accident that some of the best teachers are also the best doctors, for in teaching their students they are practising their art.

This power depends on many qualities—intelligence, patience, personality; but these may fail if they are not also combined with the ability to speak clear English. This latter is of paramount importance. I am not suggesting that the doctor's command of English is less than that of any other of the learned professions; indeed it is probably greater. What I do suggest is that his need for command of his native tongue is much greater because his most important work involves the interpretation of complicated scientific findings to people of all degrees of intelligence in words appropriate to their understanding. This is an art which demands an exact knowledge of words and ability to use them.

EDUCATION AND TREATMENT

Today while medical education is much discussed and views are controversial there seems to be general agreement that early specialisation in science at the expense of a broader general education is to be avoided; but the specific need for the student to study English so that he may express himself clearly both in writing and speaking, *because* this is an essential part of his work, is less clearly stressed and not enforced. Those who control medical education, once they recognise that this is a need, could do much to meet it by demanding a much greater command of language from the medical student. They should realise that for him the study of the English language is as important as the study of anatomy and physiology, because it is the vehicle which makes or mars all the rest of diagnosis and treatment and indeed can often make or mar research. The ability to say things clearly should be recognised as one good reason for going in for medicine. When a boy decides to do so it should be impressed on him from that moment that he must concentrate on the study of language, and school and university should stimulate this by demanding a higher standard of literary excellence in all examinations. In all these too an essay might be one of the stiffer fences.

Action on these lines would not only raise the standard of general education but by encouraging clear thinking would check those vague, meaningless statements which are so unhelpful to patients and are one of the most serious indirect causes of bad treatment.

2. *Lancet*, 1942, i, 343.

SPLINTING OF THE FEMUR FRACTURED BY GUNSHOT WOUND

THE TOBRUK AND DOUBLE-CUFF PLASTER

ST.J. D. BUXTON, FRCS

SENIOR ORTHOPÆDIC SURGEON TO KING'S COLLEGE HOSPITAL, LONDON; LATELY CONSULTING SURGEON (ORTHOPÆDICS) MEF

DURING the last 50 years many different splints have been used for fracture of the femur. Their great variety does not appear to be directly due to increasing facility in working wood and metal, but rather to the conditions of life under which the fractures occur.

At the end of the war of 1914–18 it was thought that the use of a Thomas splint had universal approval. The details of its application were taught to first-aid workers in industrial areas and to the personnel of the medical services.

At the outbreak of the present war, it was agreed that this method or a simple modification was suitable for air-raid casualties, and for the wounded, when little time would elapse between application at the aid-post and operation in the nearest operating-centre. As skeletal traction by Steinmann's pin or Kirschner wire was favoured by many under peace-time conditions, it was believed that after operation such traction would be employed and the limb rested in a Thomas splint, the cord from the stirrup being tied to the cross-bar. In fact, this method was in use in May, 1940, in the BEF, but the experience gained was too small to be of value.

The problem in the Middle East was novel in that during 1941 and 1942 the lines of communication were far longer than had previously been usual in theatres of war. The surgery of the forward area was carried out in and around Tobruk, and the usual period before the patient reached the base was 10 days in 1941 and 5–7 days in the first half of 1942. Evacuation by sea was difficult for the case of fractured femur because conditions of "carry" to the pier were uncomfortable and of "loading" often hazardous. A road and rail journey meant rough travel and usually transfers to different vehicles.

The Thomas splint technique was known to the surgeons, but the wounded so splinted stated they had much pain during the journey. Further, surgeons were anxious to employ plaster-of-paris around the limb. In 1941 patients reaching the base from Tobruk arrived in a plaster spica.

The justification for this was that after operation the limb was immobilised by the best-known method and the requirements of the plaster technique as a treatment of wounds were fulfilled. Those employing the spica had a suitable pelvic rest and could apply it quickly.

The objections to the hip spica were that few patients reached the base in comfort, and many had plaster sores on the buttocks, over the dorsum of the foot and over the tendo Achillis. Furthermore, the spica seldom does immobilise a fractured femur during a journey and rarely controls a fracture of the upper third during the first few days. Its application is difficult and requires an expert team. Even so, some time is required both for application and drying. The medical officers with a motor ambulance convoy or an ambulance train do not know what action to take when the patient is uncomfortable, as they are not accustomed to doing fracture work, and they usually decide to off-load such a patient, which adds to his delay in reaching the base. Surgeons at the base reported that these plasters usually had to be

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removed on the day after the patient's arrival and that an anæsthetic was necessary.

Hence by 1942 other forms of splinting were tried and two of these—generally known as the Tobruk plaster and the double-cuff plaster—deserve consideration. Both were devised for application after operation in a forward area to immobilise the limb during a long journey and experience showed that, provided the detail of splitting the cast was carried out, attention was seldom required during transit and there was no hurry to remove the splint at the base. Although the Tobruk plaster has been employed for treatment at the base, it is not suggested that either method should replace standard methods suitable in static hospitals.

THE TOBRUK PLASTER

The requirements are:

Thomas splint and foot-piece.
Plaster-of-paris bandages (6-inch).
2 bandages, plaster extension for treatment of fractures (one-way-stretch 'Elastoplast').
1 bandage, flannel or cotton, 6 in. wide, 2 yd. long.
3 triangular bandages.
Rubber tubing or malleable metal (length of thigh and leg).
Large pad (of wool or clothing).
Sticky felt or flannel bandage 2 in. wide.

1. After the dressing has been applied in and over the wound, pads of sticky felt are placed above each malleolus and around the tendo Achillis. (If felt is not available, three turns of flannel bandage are passed around the area.)

A length of one-way elastoplast bandage is placed along the lateral aspect of the limb. The upper end should be up to the dressing and the lower end is folded in on itself at the malleolar level, so that its breadth becomes 1½ in. and the end is allowed to hang free. The bandage is moulded around the lateral part of the limb (as it will stretch sideways and not in length) and "rubbed into" the limb so that it fits snugly. A second length is placed on the medial side of the limb and made to adhere in a similar way. The loose ends are tied together beyond the foot and a weight of 7 lb. is attached and allowed to hang over the end of the table. These two lengths form the *extension bands*.

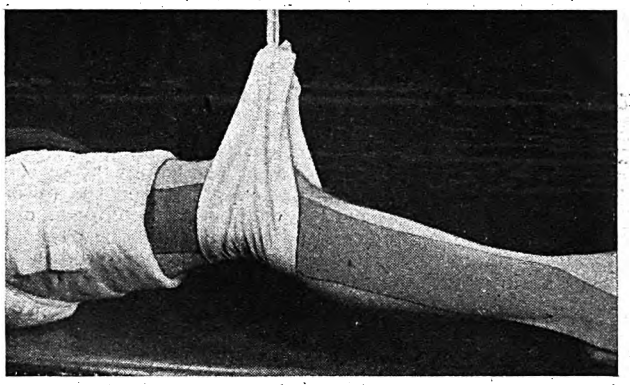

Fig. 1—Extension bands and suspension bandage for knee are shown. (Padding around ankle is not shown.)

2. The 6-inch bandage is passed behind the knee so that its centre covers the popliteal space and the ends are held 2 ft. above the knee, so that the knee rests in a sling. The ends are fixed by a cord or odd end of bandage to a pulley or beam so as to take the weight of the limb and hold the knee flexed 5–10 degrees (fig. 1).

3. Greased rubber tubing, ½ in. diameter, or greased metal strip, is placed down the whole length of the limb over the centre of the anterior surface. Plaster-of-paris bandages are passed round the limb, great care being taken that the surface in contact with the limb is smooth. First the leg and foot are covered. Turns are arranged so that the extension bands come through the plaster just above the malleoli, and the foot is fixed at a right angle to the leg. The sole of the foot must be covered up to the metatarsal necks; if it is taken beyond the toes must not be hyperextended. The thigh is then covered. Plaster slabs or rope can be incorporated along the sides of the limb to strengthen it (fig. 2). As the bandages converge around the sling this becomes compressed in front of the knee. With a finger, the openings for the elastoplast are stretched.

4. Before the plaster is dry the suspending bandage is cut and the limb and cast are placed on two slings, made

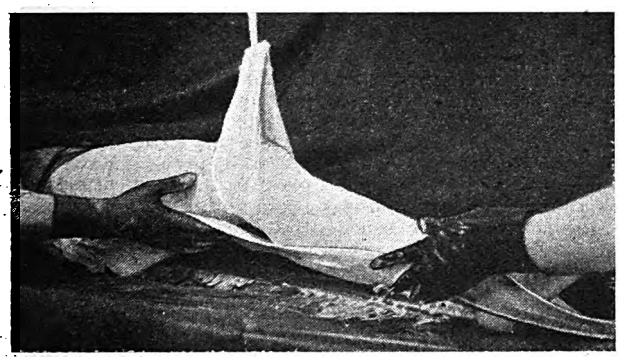

Fig. 2—Plaster applied. Slab is being added to back of cast.

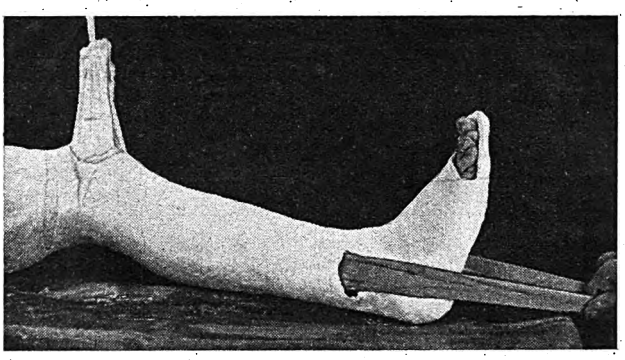

Fig. 3—Plaster completed. Extension bands with adequate opening above ankle shown.

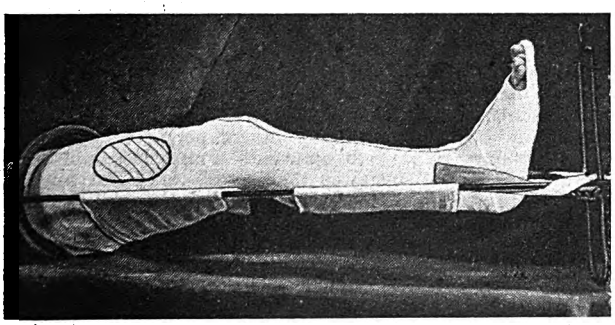

Fig. 4—Cast and limb on Thomas splint. Note split down front of cast. A pad between great trochanter and the ring, and a bandage across the upper end of the leg (to prevent cast rising from the splint) are to be added.

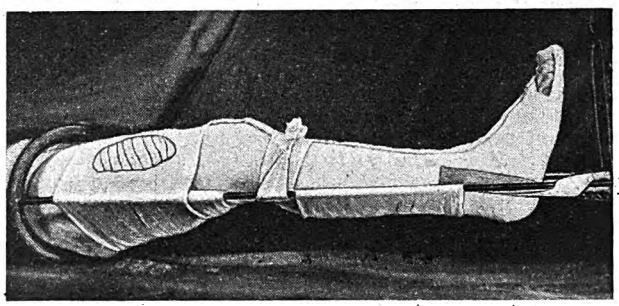

Fig. 5—The Tobruk plaster fixed to a Thomas splint by circular cuff of plaster around the cast and the bars of the splint. This partial combination of the Tobruk and double-cuff plaster is a popular and efficient modification.

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from triangular bandages, attached to a Thomas splint. With a knife, a free opening is made around the exit holes for the extension bands, and the plaster is trimmed around the suspending bandage; but that part in contact with the skin can be left in situ (fig. 3).

5. The weight is removed. The 'Thomas splint is adjusted against the tuber ischii. The loose ends of the extension bands are separated and tied in the usual way over the cross-bar at the end of the splint after the inner band has passed over the long bar and the outer one under the lateral bar. A foot-piece is clipped on.

6. The cast is split from end to end down the front of the limb (fig. 4). If rubber has been incorporated, this is pulled out and the cast cut with plaster shears; but if malleable metal has been employed a knife-cut is made directly on to it.

Three bands of cotton bandage are tied around the cast.

7. A triangular bandage is folded to a narrow-fold and placed over the front of the upper end of the leg and around the bars of the splint to prevent the cast and limb rising off the posterior slings. A large pad is placed between the ring and great trochanter to fill in the space, as large ring splints are used in forward areas.

8. When the patient is transported on a stretcher the splint is elevated from the stretcher by use of the suspension bar.

Notes.—By the use of the weight tied to the extension bands and the knee sling, the limb rests in the optimum position during the application of the plaster and there is no necessity for the limb to be held by any assistant.

The extension bands must be placed direct on to the limb. A common mistake has been to place these between the layers of plaster-of-paris. Traction on such an arrangement causes the cast to press on to the dorsum of the foot and tendo Achillis, so that sores arise.

There is no objection to the outer surface of the extension bands being greased to prevent adhesion to the cast.

THE DOUBLE-CUFF PLASTER

The requirements are:

Thomas splint and foot-piece.
Plaster-of-paris bandages (6-inch).
2 bandages, plaster extension for treatment of fractures (one-way-stretch elastoplast).
Cotton-wool for padding.
Sticky felt or flannel bandage 2 in. wide.

1. Extension bands are applied as in (1) above, but no weight is tied on the ends.

2. The limb is placed on a Thomas splint and the ends of the extension bands tied as described above.

3. A pad of cotton-wool, not less than 6 in. square, is placed above the knee in front and another of similar size behind the thigh below the tuber ischii.

4. Plaster-of-paris turns are taken around the thigh and bars of the Thomas splint.

5. After adequate padding over the skin and front of the ankle, plaster-of-paris turns are taken around the leg and splint from below the knee to a level above the malleoli.

6. A foot-piece must be attached to the splint.

Note.—It is sometimes an advantage to fill the spaces between the thigh and the bars of the splint with wool.

COMMENT

These two methods enabled many patients to travel from the Western Desert to the base, often taking 7–10 days, with greater comfort than was previously possible. The Tobruk plaster was the method of choice in 1942, but it is understood that the double-cuff has acquired popularity in 1943.

The Tobruk plaster has the advantages of providing extension and firm immobilisation, and complete limb covering. It is essential that this cast should be split, or else in some cases vessels will be compressed—even where there is no primary vascular injury—and cause gangrene of the toes.

The Tobruk plaster takes longer to put on, and requires greater experience in plaster technique, than the double-cuff plaster. The advantage of the latter is that it is very simple to apply. On the other hand it probably gives less firm immobilisation, and may cause pressure at the ankle level to the extent of producing a sore, because the foot may swell. Neglect to support the foot by a foot-piece causes foot-drop and a pressure sore over the tendo Achillis. A partial combination of the two methods is shown in fig. 5.

In using the double-cuff, no attempt is made to employ the plaster-of-paris for any purpose other than fixation.

SUMMARY

1. Standard splinting for the fractured femur requires modification when patients have to be evacuated over long distances.

2. Two useful methods of combining plaster splinting with a Thomas splint are described.

The photographs were taken at St. Nicholas Hospital, Pyrford, by the courtesy of Brigadier W. R. Bristow, and I wish to thank him and his staff for their help. The greater part of the article is an elaboration of part of a booklet, *The Treatment of Gunshot Wounds of Bones and Joints, &c.*, written by me and printed and circulated by GHQ, Middle East Forces, in August, 1942.

WATER-PITRESSIN TEST
IN THE DIAGNOSIS OF EPILEPSY

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THE diagnosis of epilepsy both in civil and military practice must usually be made on history alone, for when fits are infrequent they are rarely witnessed by a competent observer. In civil life the diagnosis is seldom a matter of urgency but in the Army it must be made quickly, because epileptics are unsuitable for military service. Further, "feigned epilepsy" has been used as a means of evading military service (Ironside 1940). The admission of cases to hospital for prolonged observation should find little or no place in the medical services of an army at war, and any rapid and reliable method of establishing the presence of epilepsy must be of considerable value. In some cases the electro-encephalogram provides such a test, but it is not always available nor are its results always conclusive; hyperventilation, small doses of 'Cardiazol' (leptazol) and the ethyl-chloride spray test have on the whole proved unreliable. The water-pitressin test having been found more satisfactory by most workers, we have used it in 96 cases, including 20 controls.

HISTORY OF THE TEST

A relation between fluid balance and the occurrence of convulsions has long been suspected.

Rowntree (1926) reviewed the literature and established that convulsions could be produced in animals by the forced ingestion of water. He found that the symptoms of water intoxication could be prevented or cured by intravenous saline.

McQuarrie (1929) studied the effect of alterations in diet, of fluid intake, and of giving 'Pituitrin' with both low and high water intake, on the frequency of epileptic seizures in children, and later he and Peeler (1931) used ingestion of water with 'Pitressin' to prevent the accompanying diuresis. Water and pitressin were given over periods of 12–48 hours at 4-hourly intervals, producing an increase in weight of from 2–5%: fits occurred in all but one of a series of 40 mild epileptics, but in none of a series of controls; petit mal was induced in one case, and the frequency of minor attacks increased in another. The cerebrospinal fluid pressure did not rise above 200 mm. during the test. Administration of sodium chloride inhibited the production of fits, a greater increase in body-weight and a longer period of hydration being necessary before a fit occurred. From these and other considerations they suggested that it was the disturbance of ionic balance to which the epileptic was more sensitive than normal, rather than the hydration itself, and put forward a tentative suggestion that the defect in epilepsy might be an abnormality of the semipermeable membrane of the brain cells.

Jacobsen (1934) using a similar test produced fits in all but 2 of a series of 40 epileptic children. Daneo (1934) had positive results in 41% of 63 proved epileptics, while Stefanacci (1934) in 42 cases had positive results in 10%. Clegg and

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Thorpe (1935) hydrated a small series of cases for three days, on the third day giving 3 doses of 0·5 c.cm. pitressin at 4-hourly intervals; 3 out of 4 cases of idiopathic epilepsy, 2 of 5 traumatic cases and only 1 of 7 cases with "atypical attacks" had fits.

Janz (1937) compared hyperventilation, leptazol and water-pitressin as diagnostic tests for epilepsy. Hyperventilation produced attacks in 10%, leptazol in 55%, while water-pitressin gave positives in 42% of 69 undoubted epileptics and negative results in 40 non-epileptics. The patients were given an alkaline diet with 9 grammes of sodium bicarbonate daily for three days, and on the fourth day were given 1 c.cm. 'Tonephin' and 3 to 4 litres of water to be drunk in 10–30 minutes; further water and injections of tonephin up to a total of 6 were given in the next 12 hours, the amount depending on how the initial weight gain was maintained. Fits occurred on an average from 5 to 8 hours after the hydration was commenced.

Roth (1937) giving as much water as possible during a one-day test period, and 3 doses of 1 c.cm. tonephin at 4-hourly intervals, produced fits in 45% of a group consisting of 28 old genuine epileptics and 1 case of traumatic epilepsy, while in 51 thought to be epilepsy, but whose fits were very infrequent, only 10% were positive. Gibson (1937) gave 300 c.cm. of water every 2 hours and pitressin at 4-hourly intervals for 24 hours, over-breathing being carried out for one minute after each injection; 6 controls gave negative results, while 6 of 11 doubtful cases were positive. Hagenmeyer and Langelüddeke (1939), following Janz's technique, produced fits in all of 10 epileptics and in none of 12 controls; it is noteworthy that the latter included 5 mental defectives who had all had fits with only 2 to 3 c.cm. of leptazol.

Janzen and Homeyer (1939), giving 3 or 4 doses of 1 c.cm. 'Pituglandol' with 1 litre of water every three hours, produced no fits in 43 healthy men with a "suspicion of epilepsy," while of 39 patients with idiopathic epilepsy 36% were positive, as were 22% of 23 cases with symptomatic epilepsy. Ziskind and others (1939) made a careful study of the effect of a large, rapid intake of fluid in 34 epileptics and 9 cases of neurosis; they found that on giving 1 litre of water per half hour to a total of 7 litres, there were fits in 11 of the epileptics and in none of the neurotics. All the fits occurred within 9 hours.

Wachter (1939) tested 15 epileptic children, producing major fits in 7 and clonic twitchings in 2; 1 case of spasmophilia gave a negative result. Viau (1939) using a similar technique had positives in 10 out of 12 epileptic children. DeLoranzo (1940), following McQuarrie's technique, produced fits in 8 out of 10 cases of idiopathic epilepsy in children, but no fits in 5 cases of epilepsy due to various causes, 1 of traumatic epilepsy, 1 of petit mal, nor in 7 normal controls. Blyth (1943) tested 87 military patients; they were encouraged to drink as much water as possible for 48 hours, a gain in weight of 2% usually being obtained, while on the third day 300 c.cm. of water and pitressin (0·25 c cm. for the first injection followed by 0·5 c.cm.) were given every two hours to a total of 10 injections. His cases were divided into those in whom idiopathic epilepsy was suspected from the history but the existence of which was denied by the patient, and those where epilepsy was claimed by the patient in the absence of supporting evidence: 45 out of 49 cases in the first group were positive as were 3 out of 38 in the second group.

TECHNIQUE

It was necessary for us to find a technique which was brief and required as little skilled observation as possible. After preliminary trials in which up to 10 doses, all of 0·5 c.cm. pituitrin, were used, the following routine was considered satisfactory, as likely to give a maximum chance of inducing a convulsion in an epileptic with minimal risk and discomfort to the patient.

The posterior lobe of the pituitary produces two clinically important principles—namely, vasopressin, which constricts arterioles, raises the blood-pressure, antagonises insulin and has an antidiuretic action, and oxytocin, which stimulates uterine muscle. 'Pitressin' and 'Pituitrin' both contain vasopressin: 1 c.cm. of pitressin contains 20 pressor units, and 1 c.cm. of pituitrin contains 10 pressor units. Pituitrin, given subcutaneously, was used in our cases, being more readily obtainable than pitressin.

The patient was kept in bed on a normal diet throughout the test and for 24 hours after it. A pint of water was given hourly from 7 AM until the test was discontinued, usually after 11 pints. Pituitrin was given hourly from 10 AM, the doses being 0·2, 0·3, 0·4, 0·5 c.cm., followed by 4 doses of 0·5 c.cm.—a total of 8 injections. The patient was weighed, after emptying his bladder at 6.55 AM, at 3-hourly intervals for 12 hours, and again at the end of 24 hours. (The weighing-machine must be one in which the patient can be weighed sitting.) The blood-pressure was measured 2-hourly from 9 AM or more frequently if there were marked fluctuations. Fluid given included water, lemonade, milk, and 'Ovaltine.' All fluid intake and output, including urine and vomitus, was measured from 7 PM on the previous day until the morning following the test; this gave a further check on water retention apart from the weight change. The test was stopped at once if a fit occurred and 1 grain of phenobarbitone was given by mouth. It was also stopped if there was severe and distressing vomiting, abdominal discomfort or severe and persistent headache. Fits usually occurred from 5 PM onwards.

As commercial preparations of pituitrin vary in histamine content, and to some extent in potency, the doses cannot be rigid. The doses were reduced if the patient's general condition, as judged by vomiting, pallor, rising blood-pressure, mental disturbance and abdominal discomfort, seemed to indicate it. Alternatively if the general condition was good, and amounts of urine of 8 ounces or more were passed in the hours from 2 PM onwards, the subsequent dose of pituitrin was 0·5 c.cm. and on occasion the test was continued for a further two hours. The total pituitrin dose in our series varied from 1·3 to 5·0 c.cm. With this technique, water was being given at the rate of 9 c.cm. per kg. body-weight per hour in the case of a 10-stone man.

MATERIAL

We have used the test in three types of case, the subjects studied being males between the ages of 19 and 38.

Group 1 consisted of undoubted epileptics, 44 in number. In these the diagnosis was based on such features as the type of aura, sudden loss of consciousness, injury during the attack (including biting of the lips or tongue), incontinence, subsequent headache and drowsiness, nocturnal attacks and the observation by an untrained observer of such features as cyanosis or of the eyes remaining open. In some cases an attack had been observed by a qualified person. We did not consider the so-called epileptic personality to be of diagnostic value in the mild type of epileptic under consideration; moreover, epilepsy not infrequently occurs in those with a hysterical personality, some cases showing both epileptic and hysterical fits.

Group 2 consisted of 32 cases in whom the above criteria were not satisfied sufficiently to justify a certain diagnosis, and in many of whom the presence of hysterical features in the past history complicated the picture. This is the group in which the test finds its greatest value.

Both these groups consisted of essentially mild epileptics; the majority were only having attacks at intervals of more than 2–3 months without sedation and some had only had one attack. All had been passed as fit for military service.

Group 3 consisted of 20 cases with hysterical personality; their attacks in no way conformed to the criteria of epilepsy and were considered to be psychogenic.

RESULTS

No fatality has been reported with this test, but we have heard of one fatal case, that of an elderly institutionalised epileptic in whom the hydration was pursued for 72 hours. Faurbye (1938) reported 3 cases in which prolonged mental confusion, in one case for over a month, followed seizures evoked by the test; a fourth case with recurring schizophrenic episodes, had an attack exceeding in severity and duration any which he had previously suffered. In our 96 patients the response to the test gave rise to anxiety in only 2.

In one, a man of poor physique though with no evidence of organic disease, after a seizure provoked by only 8 pints of fluid and 1·3 c.cm. pituitrin, the patient became dyspnœic, cyanosed and almost pulseless for about 2 minutes; he responded rapidly to warmth and 'Coramine' (nikethamide). Two and a half hours before the seizure his systolic blood-pressure had fallen from 130 to 100 mm. Hg although there was no change in the diastolic pressure and the drop had recovered an hour later. This collapse was unexplained.

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TABLE I—RESULTS OF TEST

Group	Total	Positive	Negative
1. Epilepsy	44	17 (39%)	27 (61%)
2. Doubtful	32	12 (38%)	20 (62%)
3. Controls	20	0 (0%)	20 (100%)

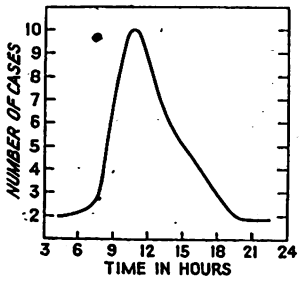
In another, following a grand mal attack at 6 PM, having had his last dose of pituitrin at 5 PM, vomiting which had occurred during the test persisted and increased; during the next 12 hours he had three more fits and was not fully conscious between the attacks; he subsequently had amnesia for a period of 14 hours, from 6 PM to 8 AM. This case was unusual in that diuresis, which usually begins during the evening of the test and reaches a maximum about 2 AM, was absent; he passed no urine from 5 PM to 9 AM the next day. It happened that no phenobarbitone for intramuscular use was available, and that given by mouth was not retained. However, 24 hours later he had no subjective complaints and there were no further fits for five days.

TABLE II—RESULTS IN RELATION TO TYPE OF EPILEPSY

Type	Group 1—Epilepsy		Group 2—Doubtful	
	Total	Positive	Total	Positive
Idiopathic (major)	35	14	29	12
Traumatic	7	3	3	0
Psychomotor	1	0	0	0
Petit mal	1	0	0	0

Apart from these, no alarming symptoms occurred. All the patients had more or less pallor, varying in time of onset and depth. About 90% had headache, half complained of abdominal fullness and nausea, while more than a quarter actually vomited. Colic developed in a few cases but was rare after we began to give initial small doses of pituitrin, rather than an original dose of 0·5 c.cm. Blood-pressure showed no constant change, though a slight increase of pulse pressure was common; any pronounced change was considered an indication for reducing dosage of pituitrin or omitting a dose. Mild diarrhœa on the day after the test was not unusal. In practice the only common indication for abandoning the test was lack of coöperation from the patient. The general understanding and behaviour of sisters and orderlies was important, and as they became more familiar with the test the number abandoned became less.

The results obtained are set out in table I. Table II gives a further analysis of the type of case, the diagnosis of traumatic epilepsy being, of course, uncertain but suggested by the onset of epilepsy within 18 months of a moderate or severe head injury, in several cases after the age of 25. It will be seen that the results were the same in groups 1 and 2.



Fits occurred from 5 to 24 hours after the onset of the test. Their frequency at different periods after the start is shown in the figure; in the case of patients who had more than one fit the first is shown. It will be seen that the majority of cases had attacks from 9 to 15 hours after the start of the test. Five had two fits, one had four, and one five at intervals from a quarter to three hours. The maximum gain in weight varied, the average being 3·5% of the original body-weight. About 90% of cases gained between 2 and 5%, the highest being 8·5%. Two positive cases showed no weight gain at the times at which they were weighed. There was no significant difference between the weight gains in groups 1, 2 and 3, nor between the positives and negatives in groups 1 and 2. Two patients in group 3 and one in group 2 had hysterical fits. The test was abandoned in 3 cases in group 1, 1 in group 2, and 6 in group 3. In the last group this was due to lack of coöperation in 4 cases, a hysterical fit in one and a severe headache in another. In group 2 the case abandoned had a hysterical fit, while in group 1 one had marked vomiting and one became drowsy after 5 injections of pituitrin, but rapidly recovered on cessation of the test; the third failed to coöperate. In spite of the high percentage of tests discontinued in group 3, this group is still comparable, for in no case was the pituitrin and water dosage less than that required to produce a fit in two positive cases in the other groups.

DISCUSSION

The results obtained by previous workers, and by us, are summarised in table III. Positive results have been reported in 10% to 100% of epileptic subjects; but, omitting children, most investigations have induced fits in about 40% of epileptics tested; Hagenmeyer and Langelüddeke (1939), whose series consisted of only 10 cases, and Blyth (1943) are exceptions to this. No average of positive results can be presented, for the different types of cases used by various workers are not comparable. It appears that fits are easier to produce in children, and several authors agree that it is easier to produce a seizure in the more severe epileptics, in whom of course the possibility of a spontaneous fit occurring during the test period is greater. It seems almost certain, from the considerable number of negative results in controls, that it is not possible to produce a fit in non-epileptic subjects by this test.

It will be seen that the technique for producing hydration has varied a good deal. Opinion as to the advisability of a preliminary period of hydration is divided. McQuarrie and Peeler (1931) state that it is easier to produce a fit by hydration followed by a period of dehydration, while other workers have hydrated the patient for two days before giving the pitressin. A more considerable gain in weight can be produced in children than adults, Viau (1939) obtaining a 20% increase in some cases. From 2 to 5% gain in weight has been obtained in adults by most workers who mention this, using widely varying techniques.

TABLE III—RECORDED RESULTS

Authors	Total	Group 1 Epilepsy		Group 2 Doubtful		Group 3 Controls		Remarks
		Total	Positive	Total	Positive	Total	Positive	
			%		%		%	
McQuarrie & Peeler (1931)	40	40	98	—	—	Uns.	0	Children. Mild epilepsy
Jacobsen (1934)	40	40	95	—	—	—	—	Children
Daneo (1934)	63	63	41	—	—	—	—	
Stefanacci (1934)	42	42	10	—	—	—	—	
Clegg & Thorpe (1935)	23	16	75	—	—	7	0	Institutional cases
Stubbe Teglbjaerg (1935)	9	9	55	—	—	—	—	2 positives of 5 traumatic epilepsy; 1 pos. of 7 atypical cases
Janz (1937)	109	69	42	—	—	40	0	
Gibson (1937)	17	—	—	11	55	6	0	3 negatives, later confirmed epilepsy
Roth (1937)	80	(a) 29	45	—	—	—	—	(a) Chronic
		(b) 51	10	—	—	—	—	(b) Infrequent attacks
Hagenmeyer & Langelüddeke (1939)	22	10	100	—	—	12	0	
Janzen & Homeyer (1939)	105	(a) 39	36	—	—	43	0	(a) Idiopathic
		(b) 23	22	—	—	—	—	(b) Symptomatic
Wachter (1939)	16	(a) 12	66	—	—	1	0	(a) Idiopathic (children)
		(b) 3	33	—	—	—	—	(b) Symptomatic
Ziskind & Others (1939)	43	34	32	—	—	9	0	
Viau (1939)	12	12	83	—	—	—	—	Children
DeLorenzo (1940)	34	(a) 10	80	—	—	9	0	Children: (a) Idiopathic
		(b) 7	0	—	—	—	—	(b) Symptomatic
Blyth (1943)	87	49	92	38	18	—	—	Adults
Present series	96	44	39	32	38	20	0	Adult males
Total ..	838	602	..	81	..	155	0	—

Uns. = Unstated.

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It has been shown that pitressin alone will not produce a fit in an epileptic. The fact that salt administration hinders the occurrence of a fit during the test is of interest in relation to the clinical observation that some epileptics take an abnormally large quantity of salt with their food. It is well known that a fit can be precipitated by heavy beer-drinking, and epileptics should always be warned against taking large quantities of fluid.

We have not seen a minor epileptic attack induced by this test, but only one of our cases was subject to petit mal; McQuarrie and Peeler (1931) report one case in which petit mal was induced and another in which the frequency of seizures was increased. Blyth (1943) mentions a minor attack as an indication of a positive test, but he does not say how many times he has seen one. No other workers have reported this, nor have psychomotor attacks been mentioned, but Faurbye (1938) reports a case in which following a test the patient began to have "absences" which persisted, and who had not previously suffered from this form of epilepsy. It was hoped that some distinction might be drawn between idiopathic and traumatic epilepsy (in which the mechanism of production of a fit is presumably somewhat different) in their reaction to the test, but this hope was not realised.

We consider that the test is of value, since in about 40% of epileptics the diagnosis of epilepsy may be established at once. It is especially valuable under the conditions of military practice, both from the point of view of the Army and the man; a day's unpleasantness is more than offset for the patient by the avoidance of weeks of uncertainty, while for the Army the value of rapid disposal is obvious. The test might also find useful application in certain medicolegal cases.

We would stress the inadvisability of carrying out the test on any but young and healthy subjects, and the importance of careful and continuous observation, with particular reference to general condition and blood-pressure. Under these conditions we believe the test to be free from risk. An interesting piece of research in the future will be electro-encephalographic studies before, during and after the test.

SUMMARY

1. For the purpose of diagnosis, fits can often be induced in epileptics by giving large quantities of fluid by mouth, together with injections of pituitary extract containing vasopressin ('Pitressin').

2. This procedure has never yet induced a fit in a person who was not an epileptic.

3. Such a test is valuable in the Services, where rapid recognition and disposal of epileptics is required.

4. Its usefulness is demonstrated by the results of investigation of 96 cases. Of 44 with epilepsy, 17 (39%) had a fit during the test. Of 32 with doubtful epilepsy, 12 (38%) had a fit. Of 20 controls with hysterical personality, none had fits.

5. The test appears to be free from risk provided the patients are kept under close observation, are young and (apart from epilepsy) are healthy.

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HEALTH IN YUGOSLAVIA.—At 5 PM on Thursday, Nov. 4, Dr. Milosh Sekulic, late senior physician of Belgrade, will speak on this subject at the Livingstone Hall, Westminster, S.W.1. Major-General P. H. Mitchiner will be in the chair.

INHIBITION OF PENICILLIN IN ROUTINE CULTURE MEDIA

G. J. HARPER

SENIOR TECHNICAL ASSISTANT, MRC UNIT, BIRMINGHAM ACCIDENT HOSPITAL

THE bacteriological investigation of wounds treated with locally applied penicillin may be complicated by the presence in wound swabs of inhibitory concentrations of the drug. The complication is usually avoided by taking bacteriological samples after the disappearance of the drug, which is rapidly absorbed from wound surfaces. In some cases, however, the drug may be applied more or less continuously, in the form of a strong preparation or a paste, and a means of destroying the penicillin taken up on the wound swab is desirable. Inactivation of penicillin by heat or chemicals—e.g., strong sulphuric acid—is obviously inapplicable, so advantage was taken of the observations of Abraham and Chain[1] to prepare a penicillin inactivator suitable for use with routine culture media. These workers noted that certain bacteria destroyed penicillin. The active agent, which they named penicillinase, was present in a number of saprophytic and commensal bacteria. Among these were described two gram-negative bacilli; in one, a contaminant of penicillin cultures, the penicillinase was present in the culture fluid; in the other, a strain of *Bact. coli*, the penicillinase was liberated after crushing the bacterial cells. Abraham and others[2] also noted that the contamination of penicillin cultures with air bacteria sometimes resulted in the destruction of the penicillin.

ISOLATION OF AN ACTIVE PENICILLINASE PRODUCER

Various bacteria, including air micrococci, were tested first for their ability to grow in 1 in 5000 penicillin broth. The penicillin-insensitive strains revealed by this means were then tested by the Oxford plate technique[2] for their powers of inhibiting the action of penicillin, appropriate controls of uninoculated penicillin broth being included. Stable preparations of all presumptive penicillinase producers were made as follows. Twenty-four hour plate cultures were washed off in a minimum of distilled water, and the suspensions precipitated with seven volumes of acetone. The precipitate, after standing for an hour, was treated for 1–2 hours with fresh acetone, and then with two changes of ether. The final ether-treated suspension was spun, and the deposit dried quickly in vacuo. The resulting fine white bacterial powder was stored in a sterile tube, and samples tested for sterility.

For titration, falling amounts of the powder, suspended in distilled water, were added to tubes containing 10 units of penicillin in 5 ml. of broth, each tube inoculated with 0·02 ml. of an 18-hour broth culture of *Staph. aureus*, and the minimum inhibiting dose of powder noted after overnight incubation. The tube readings were confirmed by plating. Table I shows the results with an air micrococcus and a number of gram-negative coliform bacilli. The seven strains of paracolon bacillus, which were biochemically identical, appeared persistently in seven wounds treated with penicillin, and their obviously high penicillinase activity prompted the investigation of the other gram-negative bacilli. The paracolon, however, proved to be the most active of all strains tested.

The paracolon bacillus is a motile gram-negative rod producing acid and gas from glucose, mannite, lactose (late) and salicin (late), but not from sucrose. The Voges-Proskauer reaction is negative and the MR reaction positive. Indol positive. Gelatin is not liquefied.

It actively destroys penicillin, for Seitz filtrates of overnight cultures in broth which had contained 5 units of penicillin per ml. contained no penicillin. Similar tests of the *Bact. coli*, *Bact. aerogenes*, and the air micrococcus showed no such complete destruction. The penicillinase is in part extracellular, for 24-hour culture filtrates were active; in one test 10 units of penicillin was destroyed by 0·5 ml. of filtrate. An attempt was

1. Abraham, E. P. and Chain, E. *Nature, Lond.* 1940, 146, 837.
2. Abraham, E. P., Chain, E., Fletcher, C. M., Gardner, A. D., Heatley, N. G. and Jennings, M. A. *Lancet*, 1941, ii, 177.

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TABLE I—PENICILLINASE ACTIVITY OF VARIOUS BACTERIA

Organism	Growth in 1/5000 penicillin broth	Result of Oxford plate test	Weight of dried culture required to destroy 10 units of penicillin (mg.)
Paracolon 7 strains)	+	No inhibition	0·05
Bact. coli (2 strains)	+	,,	2·0
Bact. aerogenes	+	,,	0·5
Bact. typhosum	−	..	..
Bact. typhi-murium	+	Inhibition	..
Bact. flexneri	+	,,	..
Ps. pyocyanea	+	,,	..
Proteus vulgaris	+	,,	..
Air micrococcus	+	No inhibition	0·5

made to prove the destruction of the penicillin by extraction with amyl acetate from mixtures of penicillin solution and dried culture which had been incubated together overnight. Parallel control experiments were performed on penicillin solution alone and on paracolon suspension alone. The amyl acetate extracts were shaken up with water, the watery fluids added to broth and tested against *Staph. aureus*. Penicillin was present in the extract of penicillin solution, but not in the other two extracts. Amyl acetate failed to extract penicillinase in demonstrable quantities.

Living cultures, culture filtrates and dried preparations of the paracolon appear to destroy penicillin. All dried preparations of the paracolon had about the same activity—equivalent to 10 units of penicillin in 0·05 mg. Since the average yield of dried culture was 13 mg. per

TABLE II—PENICILLIN INHIBITION IN COOKED MEAT MEDIUM (CMM)

No. of wounds swabbed = 16	No. of swabs showing growth		
	Before penicillin	After penicillin	
	CMM	CMM	CMM + penicillinase
	16	1*	16

* Growth of the penicillinase-producing paracolon.

overnight plate, the growth from six plates provides enough dried culture to destroy 16,000 units of penicillin. The powder has so far kept for five months without deterioration. Suspensions of the dried powder in water, held at room temperature and at 2° C., had lost no activity after 5 weeks.

Enzyme production by bacteria is in some cases enhanced by growth of the cell in the presence of the substrate, and accordingly the paracolon was subcultured twice daily for a week in 1 in 500 penicillin broth. A control series of subcultures was made in plain broth, and dried preparations of the two resulting strains made as before. No enhancement had occurred; 0·05 mg. amounts of both powders were equivalent to 10 units of penicillin.

TESTS WITH CULTURES AND SWABS

A cooked meat culture tube was inoculated with a wound swab taken before the application of penicillin; penicillin was then applied to the wound, and two swabs taken; one was inoculated into plain cooked meat medium, the other into cooked meat medium containing 1 mg. of dried paracolon. The tubes were subcultured on blood agar after 18 and 36 hours' incubation. Sixteen wounds were tested, of which fifteen contained *Staph. aureus* or *Strep. pyogenes* or both organisms, and one the penicillinase-producing paracolon. The efficacy of the paracolon preparation is shown in table II.

The powder may be incorporated in blood-agar plates. Preliminary tests showed that exposure of suspensions of the powder for 30 minutes at 50° C.—i.e., the conditions obtaining in molten agar before pouring the plate—had no effect on the penicillinase activity. In practice, 10 mg. of dried culture in 1 ml. of sterile distilled water is added to 70 ml. melted agar at 50° C. and mixed well, 3·5 ml. horse blood is added, and 10 plates are poured at once. A number of these plates and equal numbers of plain blood-agar plates were flooded with a solution of penicillin, each plate receiving a total of 50 units. After drying at 37° C. the two sets were inoculated with freshly isolated strains of *Strep. pyogenes* and *Staph. aureus*. The results of overnight incubation are shown in the first part of table III. For occasional use, the powder may be rapidly and economically applied in suspension to the surface of routine blood-agar plates; 0·1 ml. of a 1% suspension of the dried culture is spread evenly over the surface, and the plates dried at 37° C. A comparison of treated and untreated plates is shown in the second

TABLE III—PENICILLIN INHIBITION ON SOLID MEDIA

Organism	No. of strains	No. showing growth	
		Penicillin blood agar	Penicillin blood agar + penicillinase
(a) Penicillinase incorporated in medium			
Staph. aureus	25	0	25
Strep. pyogenes	21	0	21
(b) Penicillinase applied to surface			
Staph. aureus	17	0	17
Strep. pyogenes	17	0	17
C. diphtheriæ (mitis)	1	0	1

part of table III; the method is as successful as incorporation in the agar.

A comparison of plain blood-agar plates, plates containing the dried culture and plates with a surface application of the dried culture was made with actual wound swabs taken immediately before and after the application of penicillin. The results, shown in table IV, clearly demonstrate the efficacy of the paracolon preparation with specimens containing relatively large quantities of penicillin. The amount of paracolon powder per plate—1 mg.—was sufficient to destroy 200 units of the drug. This should be well in excess of the amount

TABLE IV—PENICILLIN INHIBITION IN PLATING OF ROUTINE WOUND SWABS

No.	Before penicillin	After penicillin	
	Routine media	Routine media	Penicillinase media
1	+ + + *Staph. aureus*	Sterile	+ + + *Staph. aureus*
2	+ + + *Staph. aureus*	,,	+ + + *Staph. aureus*
3	+ *Staph. aureus*	,,	+ *Staph. aureus*
4	+ + *Staph. aureus*	,,	+ + *Staph. aureus*
5	+ *Strep. pyogenes*	,,	+ *Strep. pyogenes*
6	+ + + *Staph. aureus*	,,	+ + + *Staph. aureus*
7	+ + *Staph. aureus* + + + Diphtheroids	,,	+ + *Staph. aureus* + + + Diphtheroids
8	+ + + *Staph. aureus*	,,	+ + + *Staph. aureus*
9	+ + + *Staph. aureus* + + *Strep. pyogenes*	,,	+ + + *Staph. aureus* + + *Strep. pyogenes*
10	+ + + *Staph. aureus*	,,	+ + + *Staph. aureus*

needed in routine work, but it could be adjusted according to the amount of penicillin likely to be present in the material to be examined.

Penicillinase in the form of a dried bacterial powder could be advantageously employed in blood-culture from patients with circulating penicillin, and in sterility tests of penicillin preparations intended for clinical use; where the unitage of the preparation is known, precise neutralising quantities of a standardised bacterial powder could be added as a routine to the test culture media.

The enzymatic nature of the inhibitor has yet to be proved. Though investigations in progress suggest that an enzyme is concerned, in this paper the designation

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of the active agent in the paracolon cultures by the term "penicillinase" must be regarded as tentative only.

SUMMARY

On routine bacteriological media penicillin-sensitive bacteria will not grow from samples of pathological material containing inhibitory concentrations of the drug. This inhibition may be readily overcome by the addition of a preparation of penicillinase to the media.

Stable preparations of the enzyme for routine use have been made by the acetone-drying of 24-hour plate cultures of a paracolon bacillus of high penicillinase activity, and have been shown to work satisfactorily when tested on a small series of swabs taken from wounds being treated by local application of penicillin.

The penicillinase preparation could also be employed in sterility tests of penicillin issued for clinical use.

I am indebted to the Sir William Dunn School of Pathology, Oxford, for samples of penicillin.

INTRA-ARTERIAL INJECTION OF PENTOTHAL

A WARNING

R. R. MACINTOSH, DM OXFD, FRCSE, DA
P. S. A. HEYWORTH, MA CAMB, MRCS, DA

THE dangers of injecting 'Pentothal Sodium' into an artery are not yet recognised. Though the result is sometimes serious, the risk is remote and need not deter anyone from using pentothal except possibly where no veins are visible. An artery may be injected inadvertently when it is superficial. Gray [1] points out that an aberrant ulnar artery may run "between the fascia and the skin," and in these cases "there is some danger of its being wounded when the median cubital vein is opened for the purpose of transfusion of blood or injecting saline solutions." Thus Van der Post [2] reported an injection into an aberrant ulnar artery of 0·6 gramme of pentothal in a 10% solution which resulted in gangrene of the thumb and little and ring fingers. Again, the needle may go deep to the cubital vein and enter the brachial artery, from which it is separated only by the brachial aponeurosis. An artery may be entered, too, when searching for a vein in the anticubital fossa of a plump forearm. The following two cases, one at a civilian and one at a Service hospital, illustrate the effects.

CASE-RECORDS

CASE 1.—Two years ago one of us (R. R. M.) induced anæsthesia with pentothal sodium in a series of children for tonsillectomy. An hour after induction with 1·5 c.cm. of a 10% solution, a boy, aged 5, complained bitterly of pain, not in the throat but in the hand on the side of injection. The hand and the distal part of the forearm were blanched and the radial artery was not palpable. An hour later the colour of the arm improved and the child went to sleep. It was thought that the radial artery was then palpable. Two days later the child was discharged. He subsequently used the arm normally, but on the eighth day after the injection he ran from the garden where he was playing screaming with pain in the hand. He was brought to hospital, where the following notes were made: "Hand ischæmic, cold, nails blue. Strong pulsation along the brachial artery, but palpation stops in middle of elbow; no radial pulse." Two days later an inch of the brachial and radial arteries were resected, the latter being found completely thrombosed. Pulsation in the ulnar artery was "very doubtful." There was no improvement, and three weeks later amputation was performed through the forearm.

At the time it was considered that the injection had been given inadvertently either into the artery or in its vicinity. To study the effect of intra-arterial injection, Mr. S. F. Suffolk injected pentothal into the iliac arteries of two lightly anæsthetised cats. Into the control side saline was injected without response, but injection of 0·75 c.cm. of 10% solution of pentothal produced muscular contraction in all four limbs which persisted for about 30 seconds, by which time the cat was deeply anæsthetised. One cat was killed twenty-four hours afterwards, when nothing abnormal was found. The second cat walked normally thirty-six hours after the injection.

CASE 2.—(P. S. H.).—A healthy young man was operated on for varicose veins at a Service hospital. A rubber band was applied to the upper arm and a prominent vessel of the upper third of the ulnar aspect of the forearm was selected for injection. The needle was inserted, the rubber band released, and 5 c.cm. of a 10% solution of pentothal injected rapidly. The patient writhed in agony, gasping that he felt as if boiling water was being poured over his hand and that flames were shooting from his fingers. This continued for three-quarters of a minute, when the gas mask was applied at the time when he appeared to be losing consciousness. During the operation the injected arm was examined. There was no extravasation of fluid round the vessel, but it was swollen and hard, completely thrombosed distally for the 4 inches of its superficial course down the forearm; 15 minutes later the ulnar three fingers were found to be white and cold. Half an hour later petechiæ appeared along the ulnar aspect of the forearm and hand. Colour and warmth returned to the affected fingers about three-quarters of an hour after the injection. Œdema of the whole hand developed during the night. This gradually subsided and in 10 days the patient was symptomless but remained with a thrombosed aberrant ulnar artery. On examination of the other arm it was found that an aberrant ulnar artery existed there, the twin of the vessel injected. Pulsation here was palpable until a pressure of 105 mm. Hg was reached on the sphygmomanometer. When the pulsations were occluded the vessel looked and felt exactly like a vein. It is worthy of note that compression of the patient's upper arm to make the vein prominent, either by an assistant's hand or by a rubber band, frequently obliterates arterial pulsation.

An agonising burning pain down the forearm and hand follows immediately the injection of pentothal into an artery. Lundy,[3] giving 2½% pentothal, reports two cases in which the injection was stopped when the needle was found to be in an artery because the patient complained of a "burning sensation in his hand"; no untoward effects followed in either case. Lees [4] gave 4 c.cm. of a 5% solution, on which the patient complained of a severe burning pain "as if he had plunged his hand into the fire." This injection was probably intra-arterial, though Lees attributes the effects to idiosyncrasy.

There are two ways of guarding against the ill effects of penetrating an artery. Observe the colour of the aspirated blood; the crimson of arterial blood is unmistakeable. Then when beginning the injection give a minute quantity of pentothal and wait five seconds for any untoward effects before continuing the injection.

1. Gray's Anatomy, London, 1938, p. 753.
2. Van der Post, C. W. H. *Anesth. & Analges.* 1942, **3**, 58.
3. Lundy, J. S. Clinical Anæsthesia, London, 1942, p. 542.
4. Lees, J. *Lancet*, 1943, **i**, 788.

CONCENTRATION OF SULPHAPYRIDINE IN BILE

NANCY GOUGH, BSC EDIN
(*Clinical Laboratory, the Royal Infirmary, Edinburgh*)

PUBLISHED data on the concentration of sulphonamide drugs in the bile are inconclusive and contradictory. Thus Bettman and Spier (1939) stated that, whereas with a normally functioning gall-bladder the concentration of sulphanilamide was always greater in the bile than in the blood, the reverse was true with a non-functioning gall-bladder. Spink and others (1941) claimed that the concentration of sulphanilamide was always lower in the bile than in the blood, although that of sulphapyridine was usually greater in the bile. But Hubbard and Butsch (1941), who used much smaller doses of the drug, found sulphapyridine to be in lower concentration in the bile than in the blood. Barber and co-workers (1943), in experiments on rabbits, found that in contrast to a new drug, sulphacholazine, which reaches a high concentration in bile after intravenous injection, sulphanilamide and sulphapyridine were never present in the bile except in very small amounts.

The experiments reported in this paper were made with the object of assessing the possible value of sulphapyridine as a biliary antiseptic. Patients on whom an operation for biliary fistula had been performed were the subjects. Some days were allowed to elapse after the operation before specimens were obtained, with the object of minimising the effects of the anæsthesia on the liver. After a control specimen of bile had been collected an initial dose of 2 g. of sulphapyridine was given by mouth, and thereafter a main-

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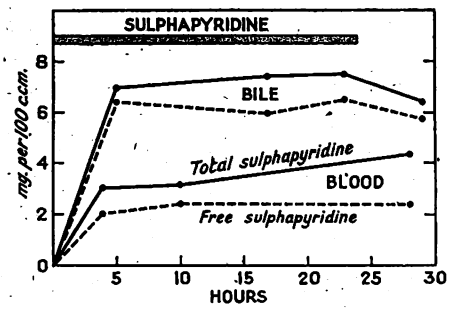
LEVEL OF SULPHAPYRIDINE IN BLOOD AND BILE (MG. PER 100 C.CM.) IN 8 PATIENTS WITH BILIARY FISTULA.

Case	Hours after initial dose	BLOOD		BILE	
		Free	Total	Free	Total
1	26	2·7	3·0	6·0	..
	32	4·0	4·7	15·5	..
2	15	..	..	6·4	6·6
	26	3·1	4·1	5·3	6·7
3	24	4·5	5·6	8·0	8·2
4	12	..	..	7·5	8·2
	26	3·1	3·6	9·2	10·4
5	3	2·5	2·8	5·1	5·9
	12	..	..	6·8	7·3
6	4	2·0	3·1	6·5	6·9
	30	2·2	4·8	5·7	6·2
7	24	3·1	3·8	12·2	13·0
8	24	2·2	2·7	9·0	11·5

In cases 1 and 2, sulphapyridine 2 g. was injected intramuscularly on two successive days.
In cases 3, 4, 5, 6, an initial dose of 2 g. sulphapyridine was given by mouth and thereafter 1 g. every four hours.
In cases 7, 8, specimens of blood and bile were taken at operation; 1 g. of sulphapyridine had been ingested every four hours for twenty-four hours before operation.

tenance dose of 1 g. every four hours. Specimens of bile were taken for analysis at intervals of one to six hours from the time of the initial dose, and blood about every six hours for two days or longer. The analyses were carried out according to the method of Marshall and Litchfield, and in the case of bile the pigments were removed by absorption on barium sulphate.



Level of sulphapyridine in blood and bile; initial dose of 2 g. of the drug and thereafter 1 g. every four hours.

The findings are set out in the table. Of the eight cases studied all showed a higher maximal level in the bile than in the blood, usually about 6–8 mg. per 100 c.cm. in the bile when the blood concentration was about 3–4 mg. per 100 c.cm. In one case the bile sulphapyridine rose to 15 mg. per 100 c.cm. This was during the second day of the experiment. The drug had been given intramuscularly to avoid nausea and vomiting, and there was apparently considerable delay in absorption, as only traces were found in the bile and blood for twelve hours after the intramuscular injection.

A typical curve of the sulphapyridine concentration in the bile and blood is shown in the figure. In this case the biliary fistula had been made six days before the beginning of the investigation. The initial dose of 2 g. sulphapyridine was given by mouth at 11 AM, and thereafter 1 g. every four hours.

Two patients were given the above dose of sulphapyridine for twenty-four hours before cholecystectomy, and bile was taken from the common duct and gall-bladder at operation. In one case, the blood concentration was 4·5 mg. per 100 c.cm. (free) while the common-duct bile contained 8·0 mg. and the gall-bladder bile 11·7 mg. per 100 c.cm. free sulphapyridine. In the other case, the blood concentration was 3·1 mg. per 100 c.cm., while the common-duct bile contained 13·2 mg. free and the gall-bladder bile 12·9 mg. per 100 c.cm. free sulphapyridine (the surgeon reported that the patient had a non-functioning gall-bladder).

It may be concluded that despite the adverse effects on the secretory and concentrating power of the liver and gall-bladder which accompanied pathological changes in these organs, sulphapyridine may reach a concentration in the bile which, in blood, would be effective against certain organisms, and accordingly sulphapyridine appears to be worthy of clinical trial in infections of the biliary tract.

I wish to thank Prof. L. S. P. Davidson and Dr. C. P. Stewart, under whose direction this work was carried out, and the surgeons of the Royal Infirmary, particularly Prof. Learmonth, for their coöperation.

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OXFORD VAPORISER FOR ENDOTRACHEAL ANÆSTHESIA

WE regret that the wrong initials and qualifications were attached to this article as it appeared on p. 509 of our issue of Oct. 23. The correct wording is as follows:

M. RUSHTON, MB LEEDS
CAPTAIN RAMC; ANÆSTHETIST TO A MAXILLOFACIAL UNIT

Captain Rushton was then serving abroad and no proof was sent to him.

New Inventions

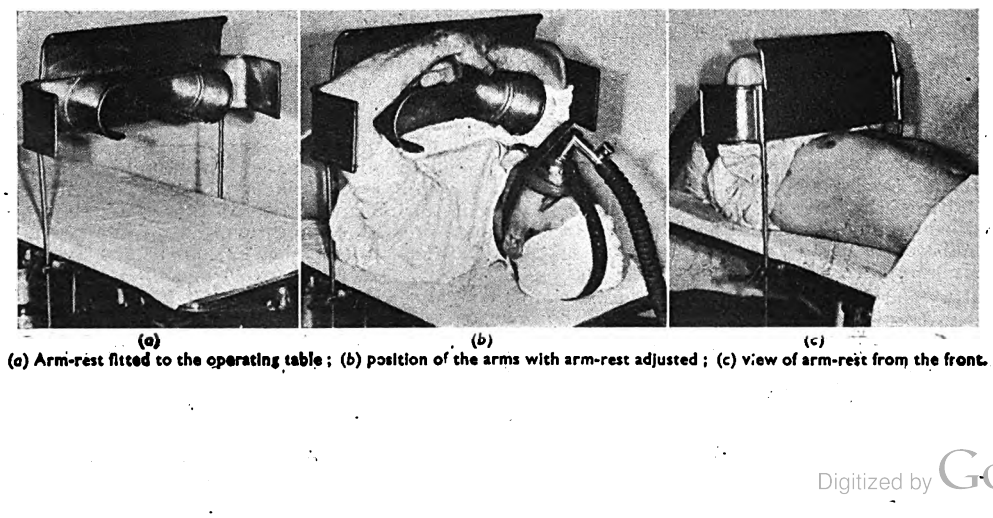
ARM-REST FOR PATIENTS AT OPERATION

IN order to facilitate the fixation of the arms at operation, a simply constructed and easily applied arm-rest has been devised. As far as I am aware, no similar appliance has hitherto been constructed.

The most useful function of the arm-rest lies in the ease with which the arms of the patient are controlled and excluded from the field of operation. It would appear that respiration is easier with the arms so placed, and when artificial respiration is called for, this appliance allows the surgeon to encircle the greater part of the chest-wall with his hands. The possibility of nerve palsy following malposition of the arms at operation is also eliminated.

The arm-rest consists of a transverse part, which slings the arms above the chest, supported by two vertical steel rods which fit into the standard goitre-screen sockets at the sides of the table (see figure). The appliance was constructed in a short space of time by the hospital master of works, the material used being stainless steel reinforced with beaded wire edging.

The patient is anæsthetised before the arm-rest is adjusted. Usually the arms lie comfortably across the arched horizontal piece, but a strap may be applied if necessary to prevent the limbs falling backwards. The appliance is particularly suitable for abdominal work and provides no hindrance to the highest epigastric procedure. It has been used consistently for the past 12 months.


(a) (b) (c)
(a) Arm-rest fitted to the operating table; (b) position of the arms with arm-rest adjusted; (c) view of arm-rest from the front.

G. RUSSELL THOMSON,
MB GLASG
Extra Dispensary Surgeon,
Western Infirmary, Glasgow.

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Medical Societies

ROYAL SOCIETY OF MEDICINE

AT a meeting of the section of medicine on Oct. 26, Dr. GEOFFREY EVANS gave his presidential address on

Mental Health

Science, he said, has recognised the organic unity of the universe. Man has not come into the world but is of the world. Until recently we have thought in terms of a great gap between the animate and inanimate, but studies of viruses, catalysts and vitamins are now beginning to bridge it. Pattern can be seen everywhere —for example, in the chromosomes and the male and female sex hormones. There is a basic pattern in the structure of brain, and Jung has postulated a universal collective psyche—an intellectual pattern. His aim, Dr. Evans said, was to present a pattern of the human mind, and to make some suggestions about it.

All our behaviour is necessarily rooted in feeling, though we live under the delusion that we are acting rationally. The basic components of the human mind are the instincts of self-preservation, creation, and destruction; he suggested that study of the mind from these different aspects can be linked with the names of Adler, Freud and Stekel respectively. The ego-instinct, given so much weight by Adler, favours the survival of the individual; the sexual and creative instinct emphasised by Freud favours the survival of the race; and so far these two by a narrow margin have overcome the third great force, the force of destruction. With these three basic instincts must be included the herd instinct, which, Wilfred Trotter held, is added to the mind by experience and education and becomes as powerful in it as the others.

Together these four components form what Dr. Evans called the sensuous sphere—the core of the human mind. External to this sphere he postulated a supersensuous sphere. After many years of practice, he said, it had dawned on him that there was a general desire in people to do better and be better. To man belongs the power to distinguish between good and evil —a distinction recognised for centuries past and noted in the book of Genesis. But man also differs from animals in his power to place things in time and space. A dog's idea of time is presumably limited by his lifetime, and his ideas of space by his immediate environment at any given moment. To man belongs the power of conceiving of time as a continuum, and of objects at a distance; he lives in a double world of space and time, and language allows him to express these concepts. Thus from the realm of the senses he enters the realm of imagination and the supersensuous sphere where the values of justice, truth and virtue exist in abstract purity. But the human mind cannot escape its own primitive core, and the senses give tone to the highest thoughts it is able to achieve in the supersensuous sphere. A man's activities are an expression of his purpose in life. Mental ill health may derive from conflict in the sensuous sphere, as Freud demonstrated, but this is only one cause: commoner causes are lack of outlet, exhaustion and defeat. Even some conflicts in the sensuous core, he thinks, may best be resolved by acceptance or by sublimation in the supersensuous sphere, rather than by analysis at the sensuous level.

The instinct of self-preservation is strong in childhood, so that the child needs security and love; later the creative instinct becomes predominant and gives occasion for self-sacrifice. Yet this instinct too demands some security and even isolation. Self-interest may be partly creative, and may subserve the purposes of the race when it is directed to maintaining the home. It is not a sufficient purpose in itself, and the man who makes a fortune through self-interest is apt to devote part of his life or his money to others. Achievement does not, in any case, deserve too much emphasis: the effort to achieve is the thing. Restriction of creative activity is responsible for much mental ill health. A woman satisfies her creative impulse in bearing children, and is also often partly responsible for creative activity in a man. Before the war creative activity was at a discount; it was hindered by inherited wealth, early pensions, jobs which consisted in tending machines which did the creative work, and recreations which took the man to watch the skilled activity of others. War, he thinks, has shown the poverty of this; it has given opportunities to both creative and destructive impulses. After the war he believes that we must give more scope to the creative impulse. Most people need a regular supply of appreciation for their mental health and happiness; a man often gets it from a woman, doctors and nurses from patients. Where there is no opportunity for creative activity people must be given opportunities for service, with its reward in appreciation.

The destructive impulse is present in all of us, and of unrecognised strength. Generally speaking, it is stronger in men than in women and finds outlets in occupations such as those of the butcher, the gamekeeper or the timber-faller. It is not readily accepted as a fundamental impulse of the human mind because its satisfaction is often associated with pain, and because like other instincts it can be perverted. Yet in itself, Dr. Evans holds, it is natural and good, giving strength of character and combativeness to overcome evil. Uncontrolled destruction is alarming and must be met and overcome by greater force or even controlled by fear. This war is not, he thinks, a "sporadic outburst of barbarism"; it has its origin in the basic forces of the human mind.

Mental ill health may arise through conflict between the supersensuous and the sensuous spheres—as in the conflict between duty and desire. It may also spring from frustration at the supersensuous no less than at the sensuous level. Science, as might be expected, he said, provides the basis for religious thought, since intellect reigns—though not supreme—in the supersensuous sphere. Science recognises universal movement, an ordered change in the direction of elaboration, which is evolution. In all this there is pattern. Religion sees design in pattern, makes of scientific concepts a conceptual whole, and provides a purpose and meaning to life. Dr. Evans holds that the function of the mind is feeling. In the sensuous sphere this feeling finds expression in the four components of this sphere; in the supersensuous sphere it is religion that gives the feeling tone to the as yet highest activity of the human mind: that is, imagination and constructive thought.

Surgeon Captain DESMOND CURRAN spoke of his experience of mental ill health in the Navy over four years. He has been impressed by the degree to which men can adapt themselves to hard situations provided they have a worthy object before them and—he felt it fair to add—a fear of punishment behind. All Service medicine, he said, is social medicine. The doctor is continually asked: "Is this man fit for duty? If not, can he be made fit, and how soon?" He had been encouraged by the results of treating neurotic cases while keeping them at duty, and told of a naval surgeon consulted by a rating complaining of a "tight-band" headache. This man, who did not smoke, did not drink and whose sexual life was "below reproach," could not understand his symptoms. But on being told that his halo was getting too tight he stopped complaining. There is something to be said for reminding people that this is a vale of tears, and that to be uncomfortable or unhappy in it is only to be expected. Naval surgeons can recommend the type of job they consider suitable for a man returned to duty, but have no power to enforce it; and this, he thinks, is a good thing. Doctors are as fallible as other men, and we must not let our brains go to our heads, or suggest that we should run the world; we shouldn't do it very well, and it wouldn't be tolerated. After the war there will presumably be some attempt to fit people into jobs that suit them, but our claims to advise on vocational guidance, though real, must not be overrated. The medical rôle is rather one of restriction: it is not for us to choose the football team though we may be able to say why a given man should not play. The team should be chosen by someone with a knowledge of football. Society would not like it if the doctor tapped a man on the shoulder and said: "Come along, I know just the job for you." In the Navy, he finds, the less said about nerves the better; and probably the same is true in civil life. He thought we might get better results if a pension for neurosis, say, carried a compulsory rehabilitation course with it. But as an old-fashioned Liberal he would rather that we kept the neuroses than that we lost the liberalism.

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Sir HENRY TIDY reminded the meeting that evolution was not an orderly business but a tangled growth. We did not derive from the monkey—our common ancestry was among the lemurs. Nature finished the monkey, just as she finished Neanderthal man; and Neanderthal man had failed. It was possible we might give place to quite a different type of man in time. Much of our progress, he thought, turned on our anatomy—on the facts that we had a hand that could grasp, and walked on two legs. The good of the herd is regarded differently in different quarters of the world and does not, he suggested, follow a pattern at all. He spoke, he said, as a hard-boiled materialist.

MEDICAL WOMEN'S FEDERATION

AT the annual general meeting of the London association of the federation on Oct. 23 Dr. MARGARET MACPHERSON spoke of the

Child in the Tuberculous Household

She began by pointing out the fact that the percentage of tuberculous infection (as judged by testing) among children in contact with closed cases is the same as that among children who have had no known contact with the disease; whereas the percentage among children who have been in contact with open cases is much higher. The aim must therefore be to keep children as far as possible from contact with open cases. In the home, the careless parent, or the old grandfather coughing by the fire, are disastrous contacts because of their intimacy with the child; and infected dust on the floor is perilously near to the mouth of the crawling baby. Yet it has been shown at Papworth that intelligent care can much reduce the danger, even from contact with open cases. She therefore laid emphasis on education—of the patient in the management of his disease, and of the public in its dangers and their avoidance. Of children under the age of 2 who die of tubercle, by far the most die of tuberculous meningitis, and she had been impressed by the complacence with which the death of a child—and sometimes two or three children—thought too precious to send away from home would be recounted by the parents. Part of this fatalism springs from the false notion, still generally current, that tubercle is hereditary, and she would like to see a campaign against that despairing belief. In the individual case direct preventive measures are sometimes possible. All contacts should be tested with tuberculin intradermally. An infant under 2 who gives a negative result should be removed from danger, preferably to the care of relations; residential homes have their own dangers for such young children. The test should be repeated within 6–8 weeks, since the child may have taken the infection but still be in the latent phase as far as skin sensitivity goes. In practice, parents are generally unwilling to face separation from their young children, but the situation is often solved by the patient leaving home for six months' sanatorium treatment; when he returns he is usually a closed instead of an open case, and he has learned the principles of managing his disease.

The infant who gives a positive result on testing must be treated as having a primary focus. He too should be taken out of range of repeated doses of infection and placed in favourable conditions. She pointed out that healing of a primary lesion, even a small one, is slow—probably never taking less than 6–8 months, and usually 2–3 years; and throughout that time there is danger of a general spread. The child should therefore be kept under observation for at least three years.

By the time they reach the age of 14, 80% of children in contact with open tubercle give a positive result on testing, and though the danger of meningitis is less over the age of 2, it remains a real one. Social services, Dr. Macpherson said, are available for protecting these children, for removing them from contact with the disease, and keeping them under observation—but the parents will not always make use of them. They are alarmed by the thought of the danger, and push it to the back of their minds; or they take fright at the many strangers by whom they must be interviewed. She considers that the entire success of protective measures for children often lies with the family doctor. He therefore needs to know what the hospital consultant, the tuberculosis officer and the child welfare worker are going to say, so that he can steer the parent into taking the right course for the child.

Reviews of Books

Food Poisoning

Its Nature, History and Causation: Measures for its Prevention and Control. ELLIOT B. DEWBERRY, FRSI. (Leonard Hill. Pp. 186. 15*s.*)

THIS useful book covers all forms of poisoning through food and by food. It is in three parts, dealing with bacterial poisoning; poisoning by metals, "natural" poisons of plants and animals and food allergy; and botulism. Three appendices on contamination by war gases, an author index, and a subject index, complete it. It does not touch food as a vehicle of parasites (apart from the salmonellas) and gives perhaps more space to botulism and less to poisonous plants than the present situation warrants; but in all other respects it is sound. The part if any played by human carriers in the contamination of food by the poisoning organisms is interesting. Savage believed it to be insignificant, for the organisms concerned are not human parasites so that chronic human carriers would be impossible. But some of the salmonellas can set up septicæmia; if this is merely an ante-mortem invasion it means nothing, but if recovery ever follows it the invading organism must rank as a human parasite, the poisoning be reckoned as a disease and chronic carriage as a possibility. Moreover, we do not know the source from which the staphylococci causing poisoning are derived. If they are of human origin, chronic carriage by man of this particular infection is probable. The salmonellas are parasites on animals used for food and also on rats and mice, and food infection is generally from these sources. One species, *S. paratyphi*, is limited to man, so paratyphoid must be derived from a human carrier; it sets up a human disease but is never the cause of food-poisoning. Spread of salmonellas by flies is suspected, but not proved and the localised distribution of outbreaks of food-poisoning is against it.

Surgery of the Nose and Throat

Editor: JOHN DEVEREUX KERNAN, MD, College of Physicians and Surgeons, Columbia University. (Nelson. Pp. 701. 70*s.*)

THIS volume maintains the high standard set by its companions. A modern outlook on operative surgery connotes an appreciation and understanding of both pathology and physiology and there are good chapters on both of these subjects. As in all books written by several people there is some overlapping. The many illustrations are not all of the same quality, and some are unnecessary; conversely some of the written descriptions might be replaced by a few good pictures. In the section on plastic surgery clarity has perhaps been sacrificed to brevity, but this is a field in which few ENT surgeons are active. Tonsillectomy in this country is now almost universally performed with the Boyle-Davis gag, and in adults intratracheal anæsthesia is desirable; but the account given of the operation is workmanlike and satisfactory. The treatment of laryngeal stenosis and abductor paralysis is described fully, and an operation devised by King combines surgical ingenuity and skill with an interesting piece of physiology. Here we are prone to give a patient with this disability a permanent tracheotomy and to dismiss the matter from our minds; it is salutary to see the thought lavished on it in other countries. Laryngofissure is readily carried out under local infiltration anæsthesia, and no tracheotomy is necessary; the wound can be closed without drainage and usually heals by first intention. Operations of slightly greater extent, including removal of portions of the thyroid cartilage, can be undertaken by the same route. Hayes Martin's method of total laryngectomy is based on sound theoretical principles, and has points in common wuth Babcock's method—unfortunately not described. Protracted fractional irradiation is mentioned only in the treatment of extrinsic carcinoma of the larynx. Like the technique of laryngectomy, the management of powerful doses of X rays and radium is improving; and if the end-results of radiotherapy come to approach those of extirpation, no doubt it will supersede laryngectomy as being less mutilating. The treatment of pharyngeal tumours is discussed somewhat sketchily, but in basing his treatment on the fundamental principles enunciated by Trotter, Orton is on sure ground.

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THE LANCET

LONDON: SATURDAY, NOVEMBER 6, 1943

THE TONSILS AND ANTIBODIES

THE reaction in recent years against wholesale tonsillectomy is based principally on the findings that tonsillectomised children are no more resistant to sore throat, otitis media, rheumatism and naso-pharyngeal infections than are children who still have their tonsils.[1] This of course does not exclude the possibility that but for tonsillectomy the former group might have had a higher incidence of these infections, nor does it mean that tonsils that are obviously diseased and a predisposing cause of frequent sore throats should not be removed. But there seems no justification for the practice, common particularly among well-to-do families, of excising enlarged tonsils as such. Indeed it now seems probable that the tonsil by trapping pathogenic bacteria, not only may act as a front-line guard against infection, but may also contribute to the production of antibodies specific against the invading micro-organisms. Enlargement of lymph-glands in response to infection is a commonplace, and is not as a rule accompanied by increase in blood lymphocytes. On the other hand, experiments by a number of independent workers [2] have supplied evidence that antibody is produced in the lymph-glands and that the germinal centres of lymph glands appear in young animals as a direct response to the injection of antigenic material like bacteria or toxins. The cells in the germinal centre are, according to MAXIMOW, primitive mesenchymal cells which may readily take on the function of phagocytic histiocytes. Enlarged tonsils and adenoids in children may therefore be interpreted as part of the body's reaction to the many foreign bacterial acquaintances which the child makes in early life.

A study by RANTZ and his co-workers [3] on the presence and persistence of specific antibodies in streptococcal throat carriers, some of whom had their tonsils removed, supplies some apposite data. Examinations were made for the presence of type-specific streptococcus agglutinins and for anti-streptolysin in the blood of 64 children, 33 of whom were later proved by culture of the excised tonsil to be carriers of group A hæmolytic streptococci. Incidentally, only half these streptococcal carriers were detected by pretonsillectomy throat cultures. Among the carriers 85% had an appreciable titre of type-specific agglutinins and 70% had antistreptolysin levels of 100 units or more, which may be compared with figures of 13% and 38%, respectively in the non-carrier group. After tonsillectomy, follow-up studies for one to three months in 21 carriers showed a definite fall in the level of antistreptolysin in 19 cases; there was no corresponding fall in streptococcus agglutinins. Interpretation of these findings is not easy. The higher antibody levels in the carrier group before tonsillectomy may have been due to the persistent stimulus from the hæmolytic streptococci harboured in the tonsil, or may have occurred in response to a recent infection although the histories did not suggest that this was so. The quick and consistent fall of antistreptolysin after tonsillectomy differs from the usual findings in patients after an acute streptococcal infection where the titre is maintained at a high level for six months in about half the cases.[4] Thus the reduction in circulating antibody is presumably to be correlated with the removal of the antigenic stimulus in the tonsil. Whether the tonsil itself was contributing to the production of antibodies is doubtful, but the foregoing evidence that this tissue may constitute an important section of the antibody factory and the old observation [5] that streptococcal carriers are resistant to fresh infection, may further impress the family doctor and his surgical colleague with the need for a conservative attitude towards the enlarged tonsil.

1. Epidemics in School. *Spec. Rep. Ser. med. Res. Coun., Lond.* No. 227, 1938.
2. See Burnet, F. M. Production of Antibodies, London, 1941.
3. Rantz, L. A., Jacobs, A. H. and Kirby, W. M. M. *J. clin. Invest.* 1943, 22, 419.
4. Mote, J. R. and Jones, T. D. *J. Immunol.* 1941, 41, 35.
5. Bloomfield, A. L. and Felty, A. R. *Arch. int. Med.* 1923, 32, 483.
6. Russell, D. S., Falconer, M. A. *Proc. R. Soc. Med.* 1940, 33, 494.
7. Mitchell, G. A. G. and Buttle, G. A. H. *Lancet*, 1942, ii, 416.
8. *Ibid*, 1943, ii, 285.
9. McIntosh, J. and Selbie, F. R. *Ibid*, 1943, i, 793.
10. Albert, A. and Gledhill, W. *Pharmaceut. J.* Sept. 4, 1943, p. 87.

PROFLAVINE WITH VARIATIONS

ACRIDINE derivatives were introduced as antiseptic dressings for wounds by C. H. BROWNING and his collaborators during the last war. The compound which was then recommended was acriflavine, which as commercially prepared consists of a mixture of 2:8-diaminoacridine methyl chloride and 2:8-diaminoacridine hydrochloride. This substance became popular for a time but then passed gradually out of favour, partly because it seemed unduly toxic and partly because most of the dye was diverted from the wound by its fixation on the gauze of the dressing. At the beginning of the present war, interest in this group of compounds was revived by the work of RUSSELL and FALCONER,[6] who showed that, although acriflavine might be toxic for wounds, another acridine derivative, 2:8-diaminoacridine, henceforth called proflavine, was non-irritant when applied in a solution sufficiently concentrated to be powerfully bactericidal. Next, MITCHELL and BUTTLE [7] noted beneficial effects, both prophylactic and curative, from the insertion of powdered proflavine into war wounds in the Middle East. Lately [8] they have reported on another acridine derivative, diflavine, which is 2:7-diaminoacridine hydrochloride; they found this slightly less satisfactory than proflavine since its bactericidal action is somewhat weaker while its action on the tissues is about the same. From experimental findings MCINTOSH and SELBIE [9] recommend that a mixture of one part proflavine powder and one or two hundred parts of sulphathiazole should be inserted prophylactically into war wounds to prevent infection by pyogenic or anaerobic organisms.

The main obstacle to the wider use of proflavine as a wound dressing has been the fear of its toxic effect on the walls of a wound; when the powder or a strong solution is inserted into an experimental wound it causes extensive necrosis of the adjacent tissues. ALBERT and GLEDHILL [10] assume that much of this damage is due to the acidity of the preparation commonly employed. The substance which is official under the name of proflavine sulphate (*BP*) is really the bisulphate, and solutions are highly acid—thus a

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0·1% solution has a pH of about 2·6, while a saturated solution has a pH of 2·0. Following a suggestion by H. BERRY, ALBERT and GLEDHILL urge that neutral salts should be used instead, and describe their preparation and properties. Thus the neutral sulphate is soluble 1 part in 4 at 15° C. and the pH of a 0·1% solution is 6·0, which is almost neutral (pH 7·0); the hydrobromide and the benzene sulphonate are soluble 1 in 100, while the salicylate is soluble 1 in 430, all three giving a pH of approximately 6·0 in 0·1% solution. Since DINGWALL[11] has shown that the usual reaction of wounds is neutral (pH 7·4) or if grossly infected slightly acid (pH 5·0–6·0), and since living tissues are very sensitive to changes in the acidity or alkalinity of the surrounding tissues, it seems reasonable to avoid highly acid wound dressings when possible; and the neutral salts of proflavine deserve sympathetic consideration.

Nevertheless, there is evidence that the tissue damage caused by proflavine preparations is due not only to their acidity but largely to the proflavine nucleus itself. Thus HAWKING[12] examined the effect of several proflavine derivatives (including some recommended by ALBERT and GLEDHILL) when inserted as powder into clean experimental wounds, the quantities employed per unit area corresponding to those recommended by MITCHELL and BUTTLE. The compounds tested included the salicylate, the *p*-hydroxyphenyl sulphonate (soluble 1 in 420, pH of saturated solution 5·9), the hydriodide (soluble 1 in 240, pH 6·8), and proflavine base itself (soluble 1 in 3000, pH 8·6). All the compounds caused extensive necrosis of the adjacent tissues, and in a small series of animals there was little significant difference between the various preparations employed. It is possible that if a 0·1% solution had been used instead of the powder there would have been less local damage. But further investigation in the laboratory and the field is clearly needed if the advantages, limitations and disadvantages of proflavine and its derivatives are to be firmly established.

CLASSIFICATION POINTS IN ANÆMIA

ONLY a few years ago the size of the red blood-cells and the colour-index were the criteria for classification of anæmias. Since then work on normal and pathological erythropoiesis, and the corresponding observed changes in red-cell size and shape, have shown that these classifications were only partially correct and often positively misleading.[13] The current British view is that stated by ISRAËLS[14] in 1941: it recognises two types of erythropoiesis, normoblastic and megaloblastic; in postfœtal life, at any rate, the latter is always pathological; megaloblastic erythropoiesis is nearly always associated with increased average cell size and increased mean cell volume; in normoblastic erythropoiesis the average size of the cells may be normal, decreased or increased in different types of anæmia. ISRAËLS held that the two types of erythropoiesis are not interchangeable, and JONES[15] reaches the same conclusions in a recent American review. JONES pleads for eradication of the ideas on erythropoiesis dating from DOAN and SABIN'S work on non-pathological material in 1925—ideas that have only lately disappeared from British textbooks and are still repeated in most American ones. He points out that megaloblasts are found "almost entirely, if not exclusively, in patients with macrocytic anæmias of the type due to a deficiency of liver principle," and he confirms the observation that large-cell anæmias are often associated with normoblastic erythropoiesis, which means that cell-size does not by itself indicate what sort of anæmia is present and what treatment is appropriate.

Another valuable help in classification is WINTROBE'S[16] finding that red cells never seem to be overfilled with hæmoglobin. They may be normally or less than normally filled; this is estimated by measuring the mean corpuscular hæmoglobin concentration, which is the ratio of the hæmoglobin content of the blood (grammes per 100 c.cm.) to the volume of the packed red cells (hæmatocrit). Thus for the morphological characterisation of an anæmia we nowadays want to know these three things.

1. Is erythropoiesis normoblastic or megaloblastic, and if it is normoblastic what qualitative variations are there in activity and morphology?
2. Is the mean cell volume (MCV = ratio of hæmatocrit to red-cell count) normal (normocytic), or larger (macrocytic) or smaller (microcytic) than normal?
3. Is the mean corpuscular hæmoglobin concentration (MCHC) normal (normochromic) or less than normal (hypochromic)?

In pernicious anæmia there is megaloblastic erythropoiesis with a high MCV and normal MCHC; the common iron-deficiency anæmia shows a distorted normoblastic erythropoiesis with low MCV and low MCHC; a hæmolytic anæmia may show hyperplastic normoblastic erythropoiesis with high MCV and normal MCHC. In temperate climates this morphological characterisation of an anæmia corresponds, for the most part, to well-defined clinical entities; so if we find a macrocytic normochromic megaloblastic anæmia we are justified in diagnosing one of the pernicious group of anæmias and proceeding with the clinical and laboratory investigations that will identify it. In temperate climates too, megaloblastosis is always associated with macrocytosis and macrocytic anæmia, whether megaloblastic or normoblastic, is always normochromic. But in tropical anæmias it seems that almost any combination can be found; TROWELL[17] reported macrocytic hypochromic anæmia with and without megaloblastosis of the marrow in Uganda, and in our Oct. 23 issue FOY and KONDI reported the extraordinary combination of megaloblastic marrow with a microcytic normochromic blood-picture. These bizarre findings, however, in no way invalidate the fundamental conclusions about the classification of anæmias; they occur in patients suffering from multiple deficiencies, often over long periods, so that the morphological characterisation of the anæmia—reached by determining *average* results—only expresses which of the various deficiencies has, at the time of the examination, gained the upper hand.

As FOY and KONDI emphasise, it is especially important in deficiency anæmias to study the qualitative changes in the blood and bone-marrow and to relate these to all the available clinical information before making a diagnosis. Correct classification depends not only on accurate estimation of the hæmatocrit and the usual blood figures, but also on

11. Dingwall, J. A. quoted by Schmelkes, F. C. *Surg. Gynec. Obstet.* 1943, 77, 69.
12. Hawking, F. *Lancet*, 1943, i, 710.
13. *Lancet*, 1942, i, 325. 14. Israëls, M. C. G. *Ibid*, 1941, ii, 267.
15. Jones, O. P. *Arch. Path.* 1943, 35, 752.
16. Wintrobe, M. M. Clinical Hematology, London, 1942, p. 225.
17. Trowell, H. *Trans. R. Soc. trop. Med. Hyg.* 1942, 36, 151.

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what JONES calls the "disciplined eye" and "the ability to recognise and appreciate differences in nuclear structure, the ability to separate pathologic from normal cells and the ability to separate normal or hyperplastic marrow patterns from dysplastic ones." Unfortunately facility in these distinctions is not easily acquired and needs experience, but, as this newer knowledge becomes disseminated, experienced investigators are able to report comparable studies. These studies on tropical nutritional anæmias may give us new information about the factors that influence blood formation, and at this time they have more than a theoretical interest, since it is only too likely that nutritional anæmia will be one of the problems that we shall have to deal with soon in Europe.

Annotations

MEDICAL ADVISER TO THE TREASURY

AFTER 36 years of medical service to the Post Office, where he has watched the messengers getting bigger (and brighter) every day, Sir HENRY BASHFORD has been elected to the Treasury where he will be consulted about welfare, environment, sick absence problems, and such like for the Civil Service staffs as a whole, especially those departments which have hitherto had no medical adviser of their own. Dr. Bashford has had an entertaining journey on the way to his destination. When in 1907, three years after leaving the London Hospital, he became assistant MO to the Post Office he entered an industrial service which had since 1855 kept sick records and which in his hands has accumulated the curriculum vitæ of a quarter of a million men and women from the ages of 16 to 60—containing, as he once remarked, unworked mines of information both for industry and medicine. Nor was he a passive spectator of this human material, holding as he did that "in an industry whose supervisors, both men and women, were selected, apart from technical qualifications, by virtue of their general knowledge of, and sympathy with their fellow-beings—and above all by virtue of their ability to be blind at the right moment—one would expect both the health standard and, I should guess, even the output to be relatively higher." These records have already helped to destroy some medical bogies (Bashford has been known to tilt at Harley Street from his corner in St. Martin's-le-Grand), such as the gravity of adolescent albuminuria, and the power of loss of wages as an incentive to return to work. More recently he was a pioneer in abolishing quarantine for healthy contacts. Long before he put any of these things on paper in these columns he had made "a plea for the more human teaching of medicine" and was quietly putting it into effect in his own practice—while his literary diversion was the telling of bedtime stories both to the cognoscenti and to children. At all events during Bashford's régime boys and girls seem to have entered the Post Office with better physique; and, having entered, their working capacity has gone up from year to year. If this sort of thing goes on at the Treasury it may be necessary to extend the retiring age of the Civil Service.

REMOVAL OF CALCULI FROM THE LOWER URETER

AN open operation for the extraction of a tiny calculus in the pelvic portion of the ureter is a formidable undertaking, and it is natural that every effort should be made to avoid it. A great number of techniques have been advocated for removing such calculi by intracystoscopic methods. Ainsworth-Davis[1] has found that, among these, removal by means of a ureteric corkscrew is a practical measure. During the last twelve months he has employed it in 20 cases. In 2 cases the stone came away at the time of the initial instrumentation and in 3 forty-eight hours after weight extension had been tried. In 6 cases the first attempt was a failure and the second attended with success. In 8 cases the stone was passed spontaneously within three weeks of the instrumentation. In only one case, in which the passage of the corkscrew proved impossible, was an open operation finally found to be necessary. He uses a Welland-Howard spiral stone dislodger, the design of which he has slightly modified. Its passage up the ureter is facilitated by carrying out a preliminary ureteric meatotomy.

1. Ainsworth-Davis J. C. *Brit. J. Surg.* 1943, 31, 34.

TUBERCLE AND THE CHILD

CROWDED homes and a rising incidence of tubercle make the protection of the child contact at once more important and more difficult. A year ago the incidence of tuberculous meningitis had risen by a half and it may be more now; in London the death-rate from pulmonary tuberculosis in 1941, as compared with 1938, was quadrupled in children under 4, and trebled in children between 5 and 14—the accuracy of the population figures having been carefully checked.[1] According to Sheldon and his colleagues[2] many young children at present elude the tuberculosis officer in his search for contacts. They note, too, that the exposure of a child to infection need only be short; two children who spent a single night in the house of a phthisical aunt became infected and one died. To ensure full investigation of child contacts they suggest special clinics for them at hospitals, where the tuberculosis officer should be affiliated to the staff, ultimate responsibility resting on the pædiatrician. On another page Professor Fleming insists that most children are infected from a human source, and that the younger the age at which infection takes place the greater the risk to life. Moreover, the usual route of infection is through the respiratory tract. That the young child ought to be shielded from infection is self-evident; how to achieve it is a different matter. Prof. Fleming would like all children under four who give positive tuberculin skin reactions to be placed in suitable surroundings and kept under careful observation. But as Dr. Margaret Macpherson pointed out (p. 574), in addressing the Medical Women's Federation, the parents are not always willing to be parted from their young children; and they may think him too precious to send out of their sight, even though it costs his life. Removal of the infectious patients, rather than the baby, from the home may be the more practical proposition; for though only a half-measure it has the merit of being acceptable. The young child with an early infection is also at the mercy of parental love. If he can be taken to live in the country, given an ample diet, and carefully supervised, well and good; but for the child whose home is a crowded house in a slum this may be impossible. Prof. Fleming's suggestion that special preventive institutions should be built for such children has attractions, but dangers too. Enthusiasm for the cure of one infection should not blind us to the fact that the young child is vulnerable to others, and that he is more exposed to them in a residential institution among his contemporaries than he is at home. We must keep steadily in mind the fact that the proper protection of these children turns largely on the provision of more and better houses for the people.

The threat carried by the older child with tubercle to his associates at school, at home, and in billets was well brought out by Dr. Marcia Hall's study of a group of such children in a reception area.[3] One child infected

1. Daley, W. A. and Benjamin, B. *Brit. med. J.* 1942, ii, 417.
2. Sheldon, W., Graham, S., Galsford, W. and Lightwood, R. *Arch. Dis. Childhood*, September, 1943, p. 157.
3. *Lancet*, 1943, ii, 35.

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2 others in her billet (one of whom died) and 4 children at school. Another infected 3 out of 5 children at his billet and 6 at school. Another child, a known contact of an open case, had escaped investigation and developed miliary tuberculosis and infected her cousin and brother at her billet and 8 out of 39 children in her class at school. The danger of meningitis is much less among children over the age of seven who take the infection; but they can be a cause of fatal disease in their younger associates. Until we find the compound which will strike through that waxy overcoat and kill it in the body we must be content to conduct a guerilla warfare against the tubercle bacillus; and it must be harried continuously. The methods are: to investigate and follow up all contacts; remove the open case from contact with his family, especially with the younger children; supervise cases carefully during healing; and, all the time, press for better housing.

PSYCHOLOGICAL TESTING IN GERMAN FORCES

IN 1941 Ansbacher gave an impressive review of military psychology in Germany [1] and the American Committee for National Morale issued a book [2] showing that the use of psychology for military purposes had been carried a very long way by the Germans. Gillespie [3] wrote of this survey that it "makes clear the breadth and intensity of what might be called psychological organisation of the German Army and people for war," and that the long psychological preparations of the Germans showed a "combination of academic science with the ablest commonsense." He noted, however, also that the military branch did not fully accept the need for psychologists in the Services; and we pointed out [4] that there had been sudden changes of policy not only in the Army but also in the Luftwaffe, and that there were defects in the reported German procedure for selecting officers and specialists. It now appears that the psychological testing service was much curtailed during 1942, first in the Luftwaffe, then in the Army. Ansbacher,[5] commenting on the report of this published in the Swiss medical review *Praxis* in October, 1942, is reluctant to believe that the curtailment was due to unsatisfactory results but is rather disposed to infer that the procedures proved impracticable under war-time conditions. This opinion depends on the large number of trained psychologists required for assessing character, since there are no standardised tests which give so true a picture of the tested person as a series of clinical judgments in realistic situations. An immense number of military psychologists would have been needed for the large German Army and Air Force, but already by May, 1940, a shortage of them had been reported, and in 1941 an expanded system for training applied psychologists was instituted. A lower qualification, "psychological diploma," was created for the products of this scheme, the previous qualification having been the standard Ph D in psychology. Ansbacher assumes that this attempt to provide a sufficient number of persons competent to perform the required duties proved inadequate, especially in the Luftwaffe.

He goes on to compare this course of events with what has happened in the United States, where, he says, the clinical approach has been deemed impracticable at present and the emphasis has been put on standardised tests, fortified by ratings supplied by trained interviewers, commanding officers or special selection boards. Until fuller details are made public as to the procedure employed in officer selection in the American army, it is impossible to judge how far this indicates that the American procedure differs from the British methods of selecting officers, in which a partially clinical approach has been found useful, along with standardised tests and ratings by combatant officers and other persons without specialised psychological training. The hypothesis which Ansbacher rejects—namely, that the results of German military psychology have proved unsatisfactory—may however prove to be the correct one, since the application of a procedure that is by no means wholly objective requires personnel with specialised experience and sound judgment, such as cannot be acquired in a brief ad-hoc training.

1. Ansbacher, H. L. *Psychol. Bull.* 1941, **38**, 370.
2. German Psychological Warfare. Committee for National Morale, New York, 1941.
3. Gillespie, R. D. *Brit. med. J.* 1942, **i**, 445.
4. *Lancet*, 1942, **ii**, 100.
5. Ansbacher, H. L. *Science*, Sept. 3, 1943, p. 218.

ANTICONVULSANT DRUGS

THE search for drugs that will stop fits without harming the patient has not been altogether in vain. In the last generation, phenobarbitone and phenytoin have been two outstanding gains, but with neither is effective dosage always free from unpleasant symptoms. It is now claimed that the sedative effects of large doses of phenobarbitone can be avoided by the addition of benzedrine.[1] The toxic effects of phenytoin are more serious, and too often make it necessary to give a dose well below that needed for maximum therapeutic effect. Some modification of this drug retaining the anticonvulsant properties but eliminating its toxic effects would be welcome. Study of the mode of action of known remedies is also proving suggestive. Two years ago Cohen and Cobb showed that azosulfamide ('Prontosil S') has a definite anticonvulsant action on some epileptics.[2] Now, with Coombs and Talbot, they have published the results of an intensive biochemical study on two of their patients, one suffering from grand mal and one from petit mal.[3] While receiving azosulfamide in doses sufficient to reduce or stop their fits, these patients showed, under strictly controlled metabolic conditions, a decrease in CO_2 content and tension in the serum, some lowering of pH, and a positive potassium balance. It has long been known that a swing towards acidosis is likely to discourage attacks, especially of the petit mal or slow-wave type. Ammonium chloride produces this swing; but it has no anticonvulsant effect, nor does it produce a positive potassium balance. Phenobarbitone produces a positive potassium balance, but no acidosis. These observations are suggestive, but the authors offer no explanation of the mechanism by which storage of potassium is achieved; nor is there reason to think that the mere administration of potassium salts is likely to be clinically effective.[4]

Petit mal or slow-wave activity is less amenable to phenobarbitone and other anticonvulsants than are major fits, but is more amenable than major fits to starvation and the ketogenic diet. With these forms of treatment, again, we get acidosis, and many endeavours have been made without definite result to find out what substance is responsible for the control of the attacks. Price, Waelsch and Putman have been experimenting with *dl*-glutamic acid, a substance which gives rise to the excretion of the unnatural isomer in the urine.[5] One molecule of *d*-glutamic acid hydrochloride should furnish one molecule of hydrochloric acid and two carboxyl groups of which one would be available for acidification. Moreover, brain tissue contains an enzyme which synthesises glutamine from *l*-glutamic acid and ammonia, thus decreasing the free ammonia in the tissue. Sufficient *dl*-glutamic acid hydrochloride was given in capsules to 7 patients to maintain the pH of the urine at about 5·0. Toxic effects were small. Reduction in seizures characterised by slow-wave activity—petit mal, psychomotor seizures—was observed, but in no case were the attacks

1. Robinson, L. J. *Amer. J. Psychiat.* 1941, **98**, 215; Cohen, B. and Myerson, A. *Ibid*, 1938, **95**, 370.
2. Cohen, M. E. and Cobb, S. *Arch. Neurol. Psychiat*, 1941, **46**, 676.
3. Cohen, M. E., Coombs, F. S., Cobb, S. and Talbott, J. H. *Ibid*, 1943, **50**, 111.
4. Hirschfelder, A. D. and Haury, V. G. *Ibid*, 1938, **40**, 66.
5. Price, J. C. Waelsch, H. and Putman, T. J. *J. Amer. med. Ass.* 1943, **122**, 1153.

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completely stopped. The patients were all happier, nearer the normal, and more alert physically as well as mentally. The number of cases is too small, and the periods of observation too short, for final judgment; but it looks as if there were a case for further trial of this compound, its derivatives and allies; and for study of its effects on potassium storage.

DESOXYCORTICOSTERONE AND BLOOD-VOLUME

ALTHOUGH desoxycorticosterone acetate has been used in the treatment of Addison's disease since 1937, little work has hitherto been published on its effects in normal subjects. In patients with adrenal insufficiency, adequate dosage rapidly restores the body chemistry to normal; but if the drug is given in excess for long periods, especially with additional salt, it may give rise to an increase in plasma-volume, with œdema and abnormally raised blood-pressure, leading in some patients to cardiac failure.[1] Its administration in large quantities (20 mg. daily for 70 days) to normal dogs, without added salt, produced hypertension of moderate degree and no evidence of cardiac enlargement or failure; but there were definite chemical changes in the blood, notably a fall in serum potassium to about half its original level, with a less dramatic rise in serum sodium and chloride.[2] The low serum potassium was associated with periodic attacks of weakness—manifested by inability to stand or raise the head—resembling closely attacks of familial periodic paralysis; and, as in that condition, the attacks were rapidly relieved by potassium. Similar muscular weakness was also noted in one human patient by Thorn and Firor. These seem to be the only examples, apart from familial periodic paralysis, where a low serum potassium is associated with attacks of weakness. Very low serum potassium has occasionally been found in alkalosis, and after large doses of insulin and carbohydrate in normal subjects, without any appreciable muscular signs.

Clinton and Thorn[3] have investigated the effect of desoxycorticosterone acetate on the plasma-volume and electrolyte balance of normals. When 10 mg. of the hormone were given intramuscularly in oily solution once daily for 5 days, plasma-volume rose, the hæmatocrit value fell, and there was a fall in urinary excretion of sodium and chlorine. The maximum increase in plasma-volume was 26% of the initial value, and the mean for three subjects was 17%. When, in addition, 6 g. of salt were given daily, much of the added salt was retained, but the mean increase in plasma-volume was almost identical. A longer experiment, using the same dosage for 15 days, showed that the chief effect was produced within the first 4 days, and further rise in plasma-volume after that was very slow. Towards the end of the period there was evidence of new red-cell formation, the total red-cell volume increasing by nearly 10% during the experiment. There is no mention of any change in the serum levels of sodium or potassium. After cessation of treatment plasma-volume returned to normal, or slightly less, within 3 days. The efficacy of intramuscular and sublingual administration was also compared: a daily dose of 40 mg. (four 10 mg. tablets) daily sublingually produced only about half the effect on plasma-volume of one daily dose of 10 mg. given intramuscularly.

These findings all show that desoxycorticosterone acetate in moderate dosage is capable of producing in normals a definite change in blood-volume in a comparatively short time, and that sublingual administration is uneconomic and ineffective compared with the intramuscular route. In none of the experiments was there any evidence of toxic changes, such as œdema, hypertension or cardiac enlargement, but the period of experiment was very short compared with some of the treated cases of Addison's disease, and the dosage minute compared with that used by Kuhlmann and his colleagues for their dogs.

1. Thorn, G. W. and Firor, W. M. *J. Amer. med. Ass.* 1940, **114**, 2517; McCullagh, E. P. and Ryan, E. J. *Ibid*, 1940, **114**, 2530.
2. Kuhlmann, D., Ragan, C., Ferrebee, J. W., Atchley, D. W. and Loeb, R. F. *Science*, 1939, **90**, 496.
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HELD TOGETHER BY THE PAINT?

AT the opening session of the Leeds Medical School last week Sir John Graham Kerr, FRS, confided his fear at the trend of modern education to an audience whose biological training had made them appreciative listeners. In man's evolution from the microbe his increasing size had been accompanied by an ever-increasing complexity of organisation, bringing speed of movement and vast powers of defence and offence, but with them the growing danger of destruction of the whole from functional failure of a component part. The introduction to his address was like the Disney picture of the awful end of the great reptile left alone while evolution passed him by. Communal evolution has its counterpart. Gigantic civilised states depend on the smooth and effective working of all their parts; centralised government control slows down the corrective reaction to emergency and takes responsibility away from those directly in touch with local needs and conditions. Let us, he said, reverse the process by decentralising. A sojourn in his early life with a primitive race in the Gran Chaco had enlightened him on the right system of direction for life—training in observation, training in the interpretation of observations, development of the habit of mental alertness. These three, plus a code of tribal ethics, had been the education of the primitive Indian community and of our own ancestors. The invention of the printed word with its possibilities of mass education had shifted the balance: today book-learning and literary culture had become the main qualifications of education.

> "I remember many years ago," he said, "having an interesting talk with a friend whose hobby it was to know all about the Clyde passenger steamers. I asked him about one particularly venerable one—the old *Ione*—and he remarked darkly 'She's held together by the paint' Do we not in these days tend to rely too much upon the paint of culture as holding our civilisation together, and to neglect rather the underlying steel framework on which real safety depends?"

Sir John would have us restore to their position those three essential factors on the training of primitive man. Such training survives indeed in the pre-school years and is rejoined when the boy embarks on his special vocation in life. Between, imprisoned in a school-room, he absorbs and memorises snippets of information—geography, history, various sciences, foreign vocabularies—without observing and puzzling out the meaning of what he observes. He is misled by the fallacious distinction between working with the hand and working with the head, when the skill of craftsmanship is in reality no less an expression of brain activity than the production of a thesis. The biologist knows that all men are born unequal, they differ in their heritage of biological capital. Its variety rules out mass production. Successful education depends upon the proper treatment of this heritage by coining it into a currency with high exchange value in the life of the individual. Uniformity during the primary phase, yes; but only to lay foundations for the development of diversity in the later phases of school, workshop, university and vocational career.

Dr. F. J. POYNTON, who died at Bath after a heart attack, was consulting physician to University College Hospital, and to the Hospital for Sick Children, Great Ormond Street. It was his great work with Alexander Paine on the ætiology of rheumatism that quickened the search for a bacterial noxa. He was in his 75th year.

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Special Articles

INCIDENCE AND TREATMENT OF TUBERCULOSIS IN CHILDREN

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IN children dying of tuberculosis, by far the most usual route of infection is through the respiratory tract. Blacklock (1932), for example, found that of 283 tuberculous children examined post mortem, 61% had the primary site of infection in the thorax.

This fact does not seem to be generally recognised—partly no doubt because of the difficulty of detecting chest lesions in children by ordinary clinical methods and partly because meningitis often develops before chest signs become evident. Most statistical reports assign deaths from meningitis to the non-pulmonary group, whereas in three-quarters of them the primary focus is in the lung. Blacklock and Griffin (1935) found a primary thoracic focus in 74% of 241 cases of tuberculous meningitis examined post mortem, and in 100 consecutive cases of tuberculous meningitis admitted to the Royal Hospital for Sick Children between April, 1939, and October, 1942, I found that 80 had primary lung infections and 6 primary abdominal infection, while in 14 the primary source of infection was not determined. The evidence of thoracic infection was obtained either at autopsy, or by radiography or by detection of tubercle bacilli in the sputum or stomach washings.

As tuberculous meningitis is the usual terminal event in children dying of tuberculosis, it follows that infection through the respiratory tract is the main cause of death from tuberculosis in children. Such infection, at any rate in the fatal cases, usually arises from human contact.

TABLE I—PERCENTAGE OF CHILDREN SHOWING POSITIVE MANTOUX REACTION (1938–42)

Age (years)	Total no.	Mantoux—positive	% positive
0– 4	3048	286	9·3
4– 7	604	159	26·3
7–10	490	187	38·1
10–13	301	135	44·8

The majority of children sooner or later become infected with tuberculosis. Using the tuberculin skin reaction as a test, it has been shown that only a small proportion of those under one year old give evidence of infection; but as age increases positive skin reactions become more and more frequent, so that at the age of twelve 50% and at twenty 70% are positive (D'Arcy Hart 1932, Blacklock 1936, Price 1941). Table I gives the incidence of positive reactions to the Mantoux test (1/1000) in children admitted to the Royal Hospital for Sick Children from 1938 to 1942 inclusive. The figures are in fairly close agreement with those of other workers. Many children recover completely and a considerable number pass through this primary infection without symptoms. In a certain number, however, the disease progresses, and in these death usually results from miliary spread and tuberculous meningitis. The problem of how to prevent this is of great importance.

It can be shown that positive Mantoux reactions have a much less grave significance in older children than in young children and infants. The incidence of tuberculous meningitis, the usual cause of death, falls with increasing age. Of 326 children dying of tuberculous meningitis in the Royal Hospital for Sick Children between the years 1931 and 1943, 70% were under four years old (table II). These figures correspond closely with those of Blacklock and Griffin (1935). The great danger of infection in young children is shown in table III. Of a series of children with positive tuberculin reactions admitted to the Royal Hospital for Sick Children, 286 were under four years of age, and one-third of these died of tuberculous meningitis; whereas 322 were over seven years of age and only 5% of these died of tuberculous meningitis.

PRACTICAL IMPLICATIONS

From the foregoing discussion two important points emerge.

1. The majority of children are infected with tuberculosis from a human source.
2. The younger the age at which infection takes place, the greater the risk to life.

Evidently, then, young children should be shielded from infection and protected from its consequences. In the first place they must be guarded against contact with a carrier of the disease; no one who has open tuberculosis should have any association with a young child. This means that when a member of a family develops symptoms, the whole household should be thoroughly examined, and all who are found to have open tuberculosis should be isolated. Secondly, children under four years of age who give positive tuberculin skin reactions should be placed in suitable surroundings and kept under careful observation.

TABLE II—AGE-INCIDENCE OF TUBERCULOUS MENINGITIS (1931–43)

Age (years)	No. of cases	% of total		Age (years)	No. of cases	% of total
0–1	66	20·24	70	7– 8	7	2·14
1–2	81	24·84		8– 9	12	3·68
2–3	48	14·72		9–10	6	1·84
3–4	33	10·12		10–11	4	1·22
4–5	28	8·59		11–12	8	2·44
5–6	20	6·10		12–13	1	0·30
6–7	12	3·68				

To put this policy into effect, a great extension of sanatorium accommodation will be necessary for the isolation of all carriers; but there is little doubt that, if it could be accomplished, human tuberculosis would soon be eliminated from the community. By eradication of the carriers, a herd of cattle can be freed from tuberculosis. The same result should be possible in a community of human beings.

The young child with early infection requires special treatment. Most of these children are not infective; in the early stages the lung lesion is closed and in any case young children do not expectorate. Hence isolation need not be rigorous. The child should live in good conditions in the country and should be guarded from the exanthemata and other infections. To promote healing of the thoracic lesion he should have an ample supply of milk and cod-liver oil or some vitamin-D preparation. For economic or other reasons it may often be necessary to provide institutional treatment. Tuberculosis sanatoria are not suitable for young children, and the fact that the child is suffering from tuberculosis, even though it is of the closed type, usually bars his admission to a convalescent home. To meet these difficulties special arrangements should be made. Sections of existing convalescent homes for children might be set apart for these cases, or special institutions (preventoria) might be built. Six months' residence in the home will as a rule suffice, for it is in the first few months after primary infection that dissemination usually takes place. Once healing has commenced, miliary spread becomes unlikely.

TABLE III—INCIDENCE OF TUBERCULOUS MENINGITIS IN CHILDREN WITH POSITIVE MANTOUX REACTIONS

Age (years)	Positive Mantoux	With meningitis
0– 4	286	92 (32·1%)
4– 7	159	26 (16·3%)
7–10	187	11 (5·8%)
10–13	135	5 (3·7%)

SUMMARY

Children dying of tuberculosis are usually infected from a human source.

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Under seven years of age, infection with tuberculosis involves grave danger to life.

Great care should be taken to prevent contact between young children and adult carriers.

Young children giving positive tuberculin skin reactions should be removed to suitable surroundings and kept under observation for about six months.

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CONFERENCE ON MENTAL HEALTH

THE new Provisional National Council for Mental Health held a one-day conference in the Caxton Hall, London, on Oct. 29. The Council, which substantially takes over the work of the Mental Health Emergency Committee, incorporates the Central Association for Mental Welfare, the Child Guidance Council, and the National Council for Mental Hygiene. This amalgamation was one of the principal recommendations of the Earl of Feversham's Committee, which reported just before the outbreak of war.

Mr. ERNEST BROWN, Minister of Health, who opened the conference, gave two main reasons for welcoming the amalgamation. It was essential, he said, that the problems of mental hygiene should be viewed as a whole; and the amalgamation would enable a much more effective appeal for public support to be made. Not the least of the Council's tasks would be to educate public opinion. Earlier action must be taken against mental trouble, and the number of outpatient centres and child guidance clinics must be increased. The Council would coöperate closely with the new local authorities which the Government proposed to create to administer the comprehensive national health service, an important aim of which would be to break down the artificial distinction between physical and mental disorders.

Sir OTTO NIEMEYER, the chairman, speaking on the development and extension of voluntary mental health services, emphasised that the present council was provisional, and that when a permanent council was formed its constitution might have a wider basis and include direct representatives of the associations of local authorities. The Council would stress the need for preventing the development of mental ill health in the first five or six years of life, and the importance of character building to ensure normal mental and emotional development. He summarised the services offered by the Council—the training it gave to specialist workers, its public lectures, its system of loaning experts and of giving advice on the establishment of child guidance clinics, the placement of difficult children, social case work; its residential homes, its information service, its lending library and its journal *Mental Health*.

LOCAL AUTHORITIES

Dr. THOMAS BEATON, supt of St. James' Hospital for Nervous and Mental Disease, Portsmouth, described the evolution of a coördinated mental health service in a relatively isolated city. When he had taken over his hospital in 1926 the post of medical superintendent had already been combined with that of medical adviser to the statutory committee for mental deficiency. This fundamental link obviated overlapping and the shelving of responsibility for borderline patients. He had started an outpatient clinic in the voluntary hospital as a centre of reference for any problem of abnormal conduct or of mental or nervous disorder, functional or organic. He had always coöperated very closely with the general practitioner, through whom alone could the work be carried into the community. He had borrowed the secretary of the local voluntary association to keep records, and this link had worked very well. For many reasons the neurotic or mental patient ought not to be treated in the wards of a general hospital. The patient had much more liberty in a mental hospital, where eccentricities passed unnoticed and without unfortunate result. He had found little difficulty in persuading patients to enter voluntarily—no more than the difficulty of persuading a patient suffering from a physical disorder to enter a general hospital. The mental hospital bogy vanished if handled firmly, but nothing was worse than to get the patient into a general hospital and then tell him after much difficulty and trouble that he had to go into a mental hospital after all.

The work of the clinic had, said Dr. Beaton, gradually increased until now it employed three full-time psychiatric social workers. In 1934 no further need existed for the local voluntary association and it had been incorporated into the Nervous and Mental Treatment Department—an innovation peculiar, as far as he knew, to Portsmouth. This department was housed in the centre of the city; it handled all the legal work connected with the Mental Deficiency and Lunacy and Mental Treatment Acts, provided a central bureau for information and liaison with all other services and with voluntary activities such as charitable organisations, the citizens' advice bureau and the juvenile courts. Its records covered eight or nine thousand cases and their families. The department had proved invaluable, and was the keystone of the mental health organisation of Portsmouth. Something of the kind should be incorporated into any contemplated mental health service. A mental treatment committee of the city council had been formed by combining the visiting committee and the mental deficiency committee. The observation ward of the infirmary was visited daily by a medical officer of the mental hospital; many cases of puerperal or post-operative origin were detected in this way. No obstacle was interposed between the rate-aided patient and the psychiatrist. All patients were dealt with purely on their clinical requirements: the mental hospital informed the public assistance officer that a patient had been admitted, and all the legal and administrative formalities were dealt with through the usual channels. The relieving officers had been asked to coöperate, and would frequently bring patients for admission on a voluntary basis. Their work had been substantially eased and they had given the hospital valuable assistance. A second child guidance clinic had been instituted in 1938 at the general school clinic and worked in close association with the school medical officer and the director of education. Delinquent children of school age were seen at the school clinic, but those over 14 who needed more time were seen at the main child guidance clinic.

The mental hospital itself had been radically adapted to the new field. Its name and its atmosphere had been completely changed together. The separate villas in the grounds had proved very suitable for the new type of case. No distinction was made between voluntary and certified patients: they were treated according to their clinical state. Red tape and formality were abolished; patients and their relatives were made to feel at home and in touch with ordinary life. Much work was done, especially through the voluntary bodies, to inform and educate the public about the realities of mental hygiene. Independence of the public health service was, Dr. Beaton concluded, essential to the mental health organisation. The psychiatrist must have freedom of initiative, and his patients were not amenable to the officialdom governing the material problems of public health. He hoped the relative autonomy of the committee of visitors would be safeguarded so that they could realise their projects without constant control and supervision by the local authority.

Mr. E. R. DAVIES, deputy clerk of the Berks CC, outlined the psychiatric work done in his county on unbilletable evacuated children and on resident problem children. Mr. J. DUNCAN, headmaster of Lankhills special school, spoke on the residential school and its place in the education of defective and subnormal children.

Sir FARQUHAR BUZZARD, chairman of the afternoon session, urged the Council to undertake a campaign among education authorities to include training in health matters in their curricula.

WAR CONDITIONS

Mental health, Dr. IAN SKOTTOWE said, was assessed in an individual by the extent to which he persistently succeeded or failed in adapting himself to the social medium in which he lived. Mental ill health was manifest when he was no longer able to carry on his manifold activities as a person, as a member of a social group, without special external help. The incidence of such

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failure could be assessed by the annual number of new cases reaching hospitals and clinics, but also by the more subtle indications of social morale such as the suicide-rate, illegitimate birth-rate, incidence of venereal diseases, convictions for drunkenness, soliciting, sexual offences and crime generally, by some kinds of industrial unrest, by church attendances, and by mass demonstrations. These wider social activities were very liable to misinterpretation, but an inquiry into their significance would be of great value—for example, a study of venereal disease patients by a psychiatrist and a psychiatric social worker. The factors leading to promiscuity were essentially proper matters for such investigation. Wild, dramatic and hasty assumptions were to be eschewed. Another approach to the problem of communal mental health was to study some special experience—for example, the bombardment of civilians from the air and the incidence of mental illness in its victims. Of 127 such people investigated by Fraser, Leslie and Phelps, 34% developed nervous symptoms, but only about 6% kept them for long. Of 35 persons buried for more than an hour one-third had no neurosis, one-third had temporary neurosis and one-third suffered for more than 10 months. Many observers had shown that some 80% of sufferers from such persistent war neurosis had a history of previous attacks or had shown constitutional instability. Reports from most of the bombed areas had been collected by Aubrey Lewis, and showed that air-raids had not been responsible for any striking lasting increase in neurotic illness. There was reason to believe, as Fairbairn had so cogently argued, that separation from a solid family or social background (rather than from a particular person or place) was the most potent factor in bringing to light unhealthy psychological tendencies.

A study of the population of Buckinghamshire, which had increased from 310,000 in 1938 to 407,000 in 1941, showed that 241 cases had been admitted to the mental hospital in 1938, a rate of 7·7 per 10,000, whereas in 1941 the rate was only 6·4. The rate among the new population (who had entered during the war) in the latter year was 7·1, and among the old population 6·1. A very different picture was shown by the less serious disorders: the actual rate of new outpatients had multiplied by about 4 times. Of the 182 new outpatients in 1942, 31 had not lived in the county before the war; the incidence of the less serious disorders was 3·4 in the new population and 4·8 in the stationary population. It was difficult to avoid the conclusion that there was some slow increase in the incidence of mental illness and that the social conditions of war were relevant to it. The long wearing process of maintaining abnormal ways of life without the stimulus of any action was making itself felt. It was not, however, increasing the more lasting and serious social failures, and the minor disorders were readily remedied. The most characteristic cases were seen at the beginning and towards the end of active occupational life. Alcohol showed a slight diminution as a causal factor and syphilis an increase. There was certainly no ground for alarm or despondency, but there is much to be done.

Miss L. G. FILDES, PH D, then spoke on the selection and classification of homes and hostels in relation to the needs of the individual child.

MEDICINE AND THE LAW

Bequests to Hospitals

CHARITABLE institutions advertise themselves patiently in legal journals; yet from time to time the object of a bequest is so imperfectly described that the testator's estate must pay for litigation to identify it. Mr. Justice Uthwatt has recently had to decide that the Manchester Royal Infirmary and the Royal Liverpool United Hospital were each entitled to legacies of £105,000 bequeathed by the late Mr. John Ashton Fielden to "Manchester Infirmary" and "The Liverpool Infirmary." It may be unjust to scold the lawyers for these misdescriptions; many testators have drafted their own wills. The usual books of reference give lists of hospitals; human nature is too lazy to consult them.

The law, of course, can tolerate no inexactitude. When the Earl of Cardigan was charged with wounding Captain Tuckett in a duel on Wimbledon Common a hundred years ago, he escaped conviction at the hands of his peers because of a mild discrepancy between the name of his victim as given in evidence and the name specified in the indictment. One was Captain Tuckett, the other was Captain Harvey James Tucket; there was no sufficient proof of their identity. Things are different now, even in the strict conditions of a criminal trial. A trivial error of misdescription in a bequest does not invalidate the gift if the giver's intention is clear. To describe a beneficiary as "rector" when he is really a "vicar" is not fatal. The rule is the same where charitable bodies are beneficiaries as where an individual is concerned. A beneficiary has sometimes been held sufficiently described if designated by a nickname or even by a wrong name proved to have been habitually used by the testator. Sometimes, of course, societies are amalgamated or change their names. A gift for the benefit of volunteers, yeomanry and militia units found its way successfully to the subsequently created Territorial Army. Occasionally a more awkward case is encountered. A bequest to the "King's Cross Hospital" went to the Great Northern Hospital, King's Cross, rather than to the King's Cross Hospital at Dundee. Another to the "Westminster Hospital, Charing Cross," was construed as meaning the Charing Cross Hospital rather than the Westminster Hospital.

It is a pity that law costs should eat up the money which is intended for charities. Naturally a testator may, especially if he uses stock forms of legal language, create difficulties for his executors. The courts have had to decide that a bequest of "furniture and effects" did not include jewellery or a motor-car, that "other articles of household use or ornament" did not include kangaroos and emus, "plate" did not include plated or silver-mounted goods, but that "books" did include the MS log-book of HMS *Victory*. These problems happen easily when a man signs a document without mentally cataloguing all his effects. They need not happen when he wants to be generous to a hospital; it is easy for him to give the institution its proper title.

HOME FROM GERMANY

WITH the prisoners-of-war who recently returned to this country from Germany came 25 officers of the Royal Army Medical Corps whose members, under the Geneva Convention, are protected personnel. We are glad to welcome the following:—

Colonel G. A. D. Harvey, CB, CMG, LRCPI
Lieut.-Colonel F. J. Morris, LRCPI
Lieut.-Colonel T. A. S. Samuel, MRCS
Major J. Burns
Major J. H. T. Challis, MRCS, DA
Major J. A. Chapel, MD EDIN.
Major W. N. S. Donaldson, MB GLASG.
Major C. H. Imrie, MB ST. AND.
Major R. Mackay
Major G. C. Steel, MRCS, DA
Major W. Eldon Tucker, FRCS
Major E. R. C. Walker, MB EDIN, FRCPE
Captain N. D. Allan, MB ABERD.
Captain A. D. Aveling, BA CAMB, FRCS
Captain E. R. Dansie, MB LOND
Captain M. Egan
Captain T. K. Elliott, MB LOND.
Captain P. A. Forsyth, MRCS
Captain E. M. Fraser
Captain R. W. Gunderson, MRCS
Captain W. C. Harris, MB GLASG.
Captain Isaac Jacobson, MB CAPE TOWN
Captain J. D. Recordon, MB ST. AND.
Captain G. E. Stoker, MRCS
Captain G. S. Trower, MB CAMB.

SUPPLEMENTS FOR THE UNDER-FIVES.—Cod-liver oil, orange juice and ferrous sulphate tablets are to be supplied free of charge this winter to all children under 5 in full-time attendance at elementary, nursery and other day schools. Each child will be allowed a 6 oz. bottle of concentrated orange juice every 4 weeks and a 6 oz. bottle of cod-liver oil compound every 12 weeks. This is additional to the vitamin products which parents can buy on surrendering the child's coupons; it is thought that many children are not receiving these supplements at home. Ferrous sulphate tablets, gr. 3, will be available for children needing them, in the opinion of the medical officer, for the cure or prevention of anæmia. The dose suggested for children aged 2–5 is a tablet on alternate days for the first week, a tablet daily for the next fortnight, and two tablets daily for the next 6 weeks, the course being repeated if necessary after an interval of a month. Larger doses may be needed for cases of pronounced anæmia.

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In England Now

A Running Commentary by Peripatetic Correspondents

As a Field Unit we were rather apprehensive about the prospect of having nursing sisters. It was not that we doubted that they would be an asset to us in the wards, but we were frankly afraid that their susceptibilities would be offended by the rough living conditions. The postponement of their arrival was hailed with sighs of relief all round the mess. However, one fine day an ambulance drew up outside the company office and eight charming QAIMNS tripped out headed by a charge sister. The orderly medical officer sized up the situation in a trice and reported breathlessly to the OC who was enjoying a well-earned gin and lime in the mess. The effect was electrical. The PMC and SMC were summoned. Arrangements were "laid on" (everything in the Army is "laid on") for tentage, for feeding utensils, for furniture, and a dozen other things including every modern convenience. Nobody was more astonished than the sisters to see the elaborate provision that was rapidly made for their comfort and segregation. They went so far as to say that they had never been accustomed to such luxury even in a base hospital. From the moment they appeared in the wards in their very attractive and one might say reassuring uniforms, there was a totally different atmosphere. Patients as well as orderlies became much more restrained. Conversations were conducted in subdued tones instead of irate brawling. The practice of using old-fashioned English seasoned with somewhat pungent adjectives ceased instantly. More important was the difference in the comfort of men who were seriously ill. The orderlies were quick to notice the sisters' skill in handling sick men, and were anxious to acquire the art themselves. Nothing has been more remarkable than the willingness of the orderlies to carry out in every detail the instructions given by the sisters. Ward routine is no longer regarded as an irksome fatigue: under feminine supervision it has become a sheer delight, even to the extent of finding some pleasure in scrubbing wash-basins and other utensils with indifferent soap and cold water. Treatment books which were formerly untidy and thumb-marked have been abandoned in favour of sister's neatly ruled book which provides a space for every conceivable eventuality. Litter and general untidiness have disappeared like snow off a dyke. In a word, the sisters have gently but firmly exercised their authority and have effected a transformation. This is becoming somewhat maudlin, so enough.

* * *

I walked about 20 miles to get mushrooms—well, say 8. I even made a sortie into the barbarous county of Kent, where grow a swarthier sort. They are scarcer than they were last week because of the moon.

"The waxing moon drives swains to Lovers' Lane
And makes the fatuous fungus hide its head.
O greedy Mother, do not be profane;
Hang up the frying-pan, pretend Desire is dead."

CHRISTINA ROSSETTI.

We could not be so nice and discriminating. We had to take all the deformities—lamella vara, valga, and vulga. We even accepted those who were living in myocetal sin with one slug. Never with multiple slugs. Thank God, we still have our standards. But we did pass a conjoined twin (wrapped in a special piece of paper). "Damn it all," said the President, "I don't see why they or it shouldn't make as good cannon fodder as the rest of 'em. Let them face the frying-pan!"

* * *

A favourite question to the Brains Trust was "what are the seven wonders of the present-day world?" One brains truster sensibly said that, for purposes of comparison, the present-day list, like the ancient one, should be made up of buildings. Such a definition comfortably narrows the choice and makes the competition easier. I do not remember all those mentioned by the Brains Trust, but among them were the Empire State Building in New York, the Great Boulder Dam, and the bridge across the Golden Horn in San Francisco. I have seen the Empire State Building but not the other two, and the common denominator of all three appears to be bigness, which in itself I do not regard as wonderful. Taken in conjunction with modern engineering appliances, the Empire State Building does not make me wonder except why it had to be so big. The Pyramids of Ghizeh and Sakkara do make people wonder how they were built without quarries or stone on the spot and without the benefit of modern lifting tackle.

No-one in the Brains Trust mentioned the Taj Mahal at Agra, but I think that anyone who has seen it would put it first on the list. - I went to Agra prepared to be critical of the Taj, because my mind has a mulish resistance to anything, such as a best-selling novel, which appears to be over-praised. The paintings, photographs and models of the white tomb on the banks of the Jumna had left me with a sense of coldness and disappointment. "What," I thought, "are all these people raving about?" The wonder of the Taj Mahal turned out to be something which has never yet got on to a painting or a photograph and certainly not into a model. It is what I suppose would be called atmosphere or feeling or spirit; something nebulous but none the less real, and in any case almost indescribable. But it made me, not an ardent sightseer, sit down in the gardens and look at the lovely thing for three hours on end. A sense of peace and happiness pervaded everything and everyone from the bats hanging upside down in the trees to the soft-eyed Indians and be-cameraed tourists on a trip round the world. No-one spoke much and when someone did it was in soft modulated voices. An Indian next to me on the bench made a caressing reference to "our dear and lovely Taj Mahal" and praised Lord Curzon for rescuing it from vandalism, and for having the gardens made and kept in order. In fact he created the Department of Antiquities to look after the ancient monuments in India. "We in India," said the Indian, "owe a lot to the ardour of Lord Kurzān." The best description I know of the spirit of the Taj is to be found in Sir Frederick Treves's *The Other Side of the Lantern*, and having read it after I left Agra, I modestly decided that there was nothing I could add to it. Here is one paragraph:

> With the first sight of the Taj Mahal there comes only a sense of indefinable pleasure. . It is no mere feeling of admiration, still less of amazement, no mere delight in a splendid building, because it does not impress one as a building. There is a sudden vision, and with it a sudden sense of ineffable satisfaction, as if in the place of a marble dome the garden had been filled with divine music. All intended criticism is forgotten. There is nothing that appeals to the judgment, or that suggests the weighing of opinion. There is merely a something that touches the finest sense of what is tender, beautiful and lovable, and brings with it a feeling of inexpressible delight.

In a lesser degree a little shady tomb called The Garden of the Unforgotten on the outskirts of Delhi has the same feeling of peace and happiness. Curiously enough Shah Jehan's faithful daughter lies buried there—the same Moghul emperor who caused the Taj Mahal to be built to the memory of his young wife. He was fortunate in his womenfolk, but his son Aurungzeb imprisoned him in the Red Fort at Agra for the last seven years of his life. At least he had the consolation of being able to look at the Taj Mahal about half a mile away along the river. In a country where women as a rule get a raw deal, the Taj Mahal is the apotheosis of womanhood.

* * *

The Final MB candidate had been examining a young man with heart disease. "Imagine that you are his doctor: what advice would you give him?"—"Well," replied the candidate, "he ought to live within his limitations; he ought to have a nice easy job."—"Yes, but you should be more definite; what sort of a job would you advise him as suitable?" The candidate, after prolonged thought: "I think I'd suggest a government department."

* * *

I have at last discovered the drill for dealing with one's snoring fellow-men, and hasten to disclose it for the benefit of infuriated night-starved humanity. It works every time. It works with fellow subalterns with whom I am so frequently bedded down. It worked with a Brigadier—a real live Full Brigadier in Gorgeous Technicolor—with whom I shared a hayloft during an exercise. It is simply this: I say, very quietly and persuasively—"You *are* making a noise, darling," and the offender grunts "Eh? Oh, sorry Darling," rolls over and pipes down without awakening. It works *every* time.

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Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

THIS session of Parliament is drawing to its close and in a few weeks the new session will open and a new statement of Government policy be made. The Government has not made up its mind about the Beveridge report as a whole, though definite proposals must soon be brought forward. But the Government has made up its mind that some form of comprehensive and unified medical service must come into being; what form has still to be decided. The Minister of Health has not yet issued his promised white paper on the medical services and it will probably not be published until after the new session has begun.

Whenever the war ends it is urgent that plans for the changeover to peace should now be made ready. The new session will have to make decisions about demobilisation, about the maintenance of controls, about foreign trade, and indeed about the whole business of the British Commonwealth and Empire. Most important of all, the new session will have to get down to the brass tacks of the terms of the armistice and the form of coöperation to be organised by ourselves, the USA, the USSR, China and the other United Nations to prevent aggression in the future. It is in the arena of these world-significant discussions, opened up in the last few days at Moscow, that the medical profession will have to state its case for the form of organisation through which it wishes to work in the future. Some form of a unified and comprehensive service there must be. But should it have links with all the Dominions and Colonies? Should it demand an executive as well as an advisory share in raising the level of nutrition in India, in the tropical colonies, perhaps through the International Health organisation of the League of Nations? It is the work done by the League in the past that made it possible at Hot Springs to agree on the creation of a world authority to achieve freedom from want. The new unified and comprehensive medical service should claim for itself a position on the general staff of the nation analogous to that achieved by the Army Medical Services on the military staff during this war.

FROM THE PRESS GALLERY

Soil Culture and Public Health

IN the House of Lords on Oct. 26 Lord TEVIOT called attention to food values in relation to agricultural methods in view of their importance to the health of man, animal and plant. Our hospitals, he declared, were full to overflowing, he was perturbed at the number of diseases among our farm stocks, while the diseases among our crops were legion. The cause of this tragedy, he affirmed, was to be found in food. A balanced diet was necessary, but unless the components came from a healthy soil, rich in humus, life-giving and disease-resisting properties must be deficient. Crops doped with stimulants, dressings or sprays could not impart resistance to disease. Lord Teviot asked for a royal commission or committee of inquiry. Besides representatives from the Ministries of Agriculture, Health and Food the Government should enlist the help of experts such as Sir Robert McCarrison, Dr. Lionel Picton, Sir Albert Howard and Lady Eve Balfour. The Earl of PORTSMOUTH compared the medical services and other amenities to the cart and its furniture, but food was the horse which alone can draw the cart. He thought we were in danger of getting everything arranged inside the cart, and forgetting the horse. He asked the Government to initiate a comprehensive experiment on a large block of land treated according to different methods. From that there should be built up integrated research concerned with all types of plant and animal life and human beings as a community. Such an experiment would have to cover at least twenty years, but might show strong indications within a few years.

Lord GEDDES described Dr. Enid Charles's demographic investigation on Prince Edward Island (*Canadian Journal of Economics and Political Science*, 1942, 8), which is the only social organisation of Western Europeans which had not shown in the last fifty years a sharp fall in the birth-rate. The population was living much as Lord Teviot had suggested all populations should live, drawing their food fresh from the sea and from the field. Dr. Charles had been struck by the difficulty of assigning any one influence in the observed facts as a cause, and she had worked out correlations between health and reproduction and the things which were known to affect them. For instance, taking reproduction as one of the indices of positive health, she found that with rise of income there was a fall in reproduction, with urbanisation there was a fall in reproduction, and if a large number of women were employed in any occupation that became a low-reproduction occupation. Only between a third and two-fifths in the variations in the manifestations of positive health could be accounted for, said Lord Geddes, by environment, the remaining two-thirds or three-fifths were not explained unless they had an association with the nutritional type with which the individual was by descent associated. But how far food alone was responsible for this or that population it was not possible to say without demographic examination, and also external experimentation. Lord Geddes also cited from his own experience in Northern Rhodesia an example of creative medicine. The country had been depopulated by sleeping-sickness, malaria and other tropical diseases. Since 1925 the doctors and agriculturists had turned it into a health resort. The people had been given food grown on rich humus soil with plenty of life in it, disease had been beaten back, and the positive health of these people was based on food.

Viscount BLEDISLOE urged that the time had come for research not conducted in watertight compartments on the health of plants, on the health of animals, and on the health of human beings, and some relation between the soil and all of them, but comparative research on the important problem of the inter-relation between the morbid conditions of soil, plant, animal and human being.

Lord GLENTANAR referred to proposals put forward in a memorandum by members of their Lordships' House for producing after the war a great quantity of protective foods in this country.

The Duke of NORFOLK, joint parliamentary secretary of the Ministry of Agriculture, deprecated any suggestion of antagonism between chemical fertilisers and humus. It was not a question of fertilisers versus dung, but of using both to the best advantage and in proper proportion. There was no evidence whatever from farming or medical experience, or from the scientists, that the proper and balanced use of fertilisers had any harmful effect whatever on the soil, on the health of crops or of man. The Ministry of Health were not aware of any medical evidence in support of the view that food produced from soil fertilised by artificial manures was sometimes dangerous to health. There were some soils, mostly outside Britain, deficient in certain minerals which affected the health of animals, and occasionally men who lived entirely on the produce of this particular land, but in Britain few people lived entirely off their own land.

Workmen's Compensation

In the House of Commons on Oct. 21 Mr. HERBERT MORRISON, Home Secretary, moved the second reading of the Workmen's Compensation (Temporary Increases) Bill. He said that on the ground of the change in the wages level the Government were proposing as a temporary measure, pending the introduction of a new and more comprehensive scheme, an increase in the rates of benefit. It was essential, however, that any increase should not be such as would prejudice the fair consideration by the Government and the House of the proposals in respect of workmen's compensation, and possibly about the extent of other proposals, in the Beveridge report. The Beveridge proposals were now under consideration but no final decision had yet been made. Mr. Morrison pointed out that the benefits payable under the existing acts for single men were in excess of the benefit proposed under the Beveridge scheme (35*s.* as against 24*s.*), but for the married man the standard now may fall short by 5*s.* of the Beveridge proposals. Under the new bill the allowances for a married man would be increased to 40*s.* for the first 13 weeks with an additional 10*s.* afterwards, making a total of 50*s.* The single man's compensation would be increased by 5*s.* and after the first 13 weeks

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to a maximum of 40s. The children's allowances would be increased to 5s. a week for each child. In fatal accidents the minimum payment, where there was an adult dependant, would be increased from £200 to £300 and the maximum from £300 to £400. The additional payments for children would also be increased up to a maximum payment of £700. It was estimated that the cost of compensation would be increased by this and the previous bill to £17,500,000 a year, which meant an increase of 75% since 1938. If possible it was intended that the bill should come into force on Nov. 29. The House, said Mr. Morrison, need not be apprehensive that the passage of this bill would be taken as relieving the Government in any way of arriving at an announcement of a decision on the Beveridge proposals for the permanent revision of the system at the earliest possible date. He thought that the whole structure and organisation of workmen's compensation was inappropriate to the year 1943. (Cheers.) But the present measure would substantially benefit many unfortunate victims of industrial accidents. In the debate which followed members of all parties, while accepting the Bill as a temporary makeshift, strongly pressed the need for more comprehensive and permanent legislation as soon as possible.

When the bill was considered in committee on Oct. 27 Mr. NESS EDWARDS proposed an amendment to clause 1 which would set aside the 13 weeks' limitation in respect of the 5s. and 10s. increase for the single and married man respectively. As the bill stood, he declared, 92% of the men and women injured in industry would receive no increase. Workers in Government factories, Civil Defence workers and Service men and women all received more generous terms and Mr. Edwards made a special appeal for those engaged in the hazardous work of mining. The amendment received support from members of all parties and Mr. D. L. LIPSON said "I hope the Home Secretary realises the strength of feeling on all sides of the committee for this amendment, No-one has spoken but Ministers in support of the attitude taken up by the Government." But Mr. MORRISON stood by the bill and the amendment was lost.

QUESTION TIME

National Health Service

Sir ERNEST GRAHAM-LITTLE asked the Prime Minister whether, as the institution of a universal free health service conducted by full-time salaried medical officers, involving the ultimate extinction of private practice, came into the category of a far-reaching change of a controversial character not directly needed for the war effort, he would declare that decisions regarding such a service should not be made without a general election.—Mr. E. BROWN, Minister of Health, replied: I think that my hon. friend should first await the promised white-paper, so that he may see what proposals are in fact put forward in it as the basis for public discussion, before he raises the last part of the question.

Tuberculosis Allowances

Mr. W. F. JACKSON asked the Minister of Health why tuberculous patients, who were considered hopeless cases and those suffering from non-pulmonary tuberculosis, were excluded from the benefit of the new financial allowances paid by local authorities.—Miss F. HORSBRUGH replied: The special arrangements were authorised to enable persons to give up work temporarily for treatment which is in the interest of the public health no less than their own. The association with the war effort which has been the justification in such cases for making repayment from Exchequer funds under emergency powers is not applicable to the other cases cited, but the fact that certain limitations must on this ground apply to such repayment from the Exchequer does not affect the power of local authorities to grant assistance within the scope of their statutory powers.

Experiments with BCG Vaccines

The Agricultural Research Council, with the collaboration of the Ministry of Agriculture and Fisheries, have found sufficient herds to start the field experiments with BCG vaccine, and further herds may be included in the future. The test is one which must last over 5–6 years, of which the present is the first. It is clearly much too early to reach any conclusions. (Captain J. H. F. MCEWEN replying to Brigadier CLIFTON BROWN.)

Nurses in Factories

Replying to a question Mr. GEORGE TOMLINSON said: An analysis of the registration forms received as a result of the national registration of nurses and midwives carried out on April 10 showed that there were 8389 nurses employed in industry, of whom 185 were men; about half the women so employed have been admitted either to the general or to one of the supplementary parts of the State Register for nurses.

Divorce Decrees for Lunacy

The ATTORNEY-GENERAL informed Petty-Officer A. P. HERBERT that the numbers of decrees nisi granted in divorce cases started in London under the Matrimonial Causes Act, 1937, for the cause of insanity, were as follows: in 1938, 77; in 1939, 222; in 1940, 111; in 1941, 106; in 1942, 139; in 1943 (to Oct. 12), 96.

Public Health

Health of London

IN spite of reductions in staff and new tasks arising out of the war, Dr. Allen Daley can report that in 1942 the peace-time work of his great and complex department continued unabated. The child population of London—and probably the adult as well—increased considerably during the year, from 148,000 in January to 220,000 in December, 1942. For all age-groups except entrants the proportion of nutritionally unsatisfactory children was lower than in 1938; for entrants the 1938 figure was 6·46% and the 1942 one 6·90. School inspection showed an improvement in general cleanliness, and the percentage of children with nits or pediculi was only 1·9 in 1942, compared with 3·0 in 1941 and 2·3 in 1938. There were 7500 less deaths but 6700 more births than in 1941. There was a gratifying fall in deaths from infectious diseases, diphtheria causing only 51 deaths in 1942 compared with 82 in the previous year; scarlet fever has almost ceased to be a cause of death—it killed only one person in 1942. Notifications of tuberculosis rose, but deaths fell substantially; when the population at risk is taken into account it seems that the sharp upward trend in the rate of new cases has been checked. The neonatal mortality fell from 28·4 per 1000 live births in 1941 to 24·7 in 1942, and the infant mortality from 57 to 50; these rates are much better than they were at the corresponding period of the last war, but have yet to reach their prewar best. Maternal mortality fell in the year from 3·05 to 2·51, but the rates for 1940 and 1939—1·98 and 1·97—remove any grounds for complacency. There were fewer men and women attending the venereal disease clinics for the first time, both with syphilis and gonorrhœa, but these clinics deal mainly with civilians, whose numbers are falling, and many cases of gonorrhœa are now treated by private doctors instead of at the public clinics because sulphonamide treatment is comparatively simple to carry out; Dr. Allen Daley says there is little doubt that the incidence-rate is increasing.

Infectious Disease in England and Wales

WEEK ENDED OCT. 23

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 3317; whooping-cough, 1459; diphtheria, 725; paratyphoid, 0; typhoid, 7; measles (excluding rubella), 546; pneumonia (primary or influenzal), 579; puerperal pyrexia, 158; cerebrospinal fever, 46; poliomyelitis, 13; polio-encephalitis, 0; encephalitis lethargica, 0; dysentery, 249; ophthalmia neonatorum, 91. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Oct. 20 was 1962. During the previous week the following cases were admitted: scarlet fever, 229; diphtheria, 36; measles, 18; whooping-cough, 36.

Deaths.—In 126 great towns there were no deaths from enteric fever, 1 (1) from measles, 1 (0) from scarlet fever, 13 (1) from whooping-cough, 11 (1) from diphtheria, 51 (6) from diarrhœa and enteritis under two years, and 13 (4) from influenza. The figures in parentheses are those for London itself.

Hendon and Birmingham each reported 4 deaths from diarrhœa. The number of stillbirths notified during the week was 200 (corresponding to a rate of 32 per thousand total births), including 24 in London.

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Letters to the Editor

FULL-TIME SERVICE

SIR,—In his *Instincts of the Herd in Peace and War* Wilfred Trotter wrote :—

"Man is intolerant and fearful of solitude, physical or mental. This intolerance is the cause of the mental fixity and intellectual incuriousness which, to a remarkable degree for an animal with so capacious a brain, he constantly displays. As is well known, the resistance to a new idea is always primarily a matter of prejudice, the development of intellectual objections, just or otherwise, being a secondary process in spite of the common delusion to the contrary."

If he had been seeking an illustration in support of this thesis, he could hardly have found a better one than the reaction of the profession to the introduction of the National Health Insurance Act, 1911. After such a warning we ought to be on our guard lest once again we are carried away by instinct, and we must do our best to distinguish in our minds between prejudice and logic. This is by no means easy but if we recognise that we are by nature instinctively prone to prejudice against new ideas, we are in a position to make some allowance accordingly.

Probably no medico-political problem is, or has been, of greater moment than whether we, as general practitioners and consultants, should be prepared to accept service as whole-time employees of the state, in the reconstitution of the medical services of the country which must inevitably take place after the war is over. If we accept whole-time service we must also accept a salary, which will be fixed in accordance with our particular duties, and which we will not be able to supplement by fees. There is, therefore, no need to discuss the question of salary and whole-time service as separate items.

On looking through the reports of the various assemblies and committees which have discussed the problem one can distinguish two fairly well-defined objections to a whole-time service. First it is said that under a whole-time service the free choice of a doctor by the patient would fade or disappear entirely. If this were true it would be a strong objection, but the reasons are not very apparent. Secondly, against a salaried service is set the fact that, in general, people tend to value what they pay for on the spot more highly than that which comes to them free, or for which they have paid in an indirect manner by insurance or taxation. No-one who has practised for any length of time, whether as a family doctor or consultant, can doubt that this is very often true.

Besides these two main lines of opposition there are many more personal and individual objections to whole-time service. There is no doubt that many doctors do not want to be bound in any way as servants of the state. They like to be financially independent, to see their practices grow, and to feel that they are beholden to no-one but their own good work for their success. Under any salaried scheme it is difficult to see how advancement can come in the same way directly as a result of individual effort. Promotion is bound to wait on vacancies and the selection of an appointments' committee. Again many have had experience in the fighting services, where so many things must be put up to higher authority through the "usual channels," and know only too well how sluggish the stream in these channels can be. They therefore distrust bureaucratic control in any form, believing that it hampers and stifles individual initiative and freedom, both of thought and action.

Rightly or wrongly, there is also a fear that the conditions of service will be unsatisfactory. Admittedly none have as yet been laid down in any detail, but most of us can recall the necessity to black-list certain local authorities because they cut the rates of pay for some of their medical officers below the BMA minimum, and such memories die hard. Some will have unhappy experience with regional medical officers at whose inspections attention is focused primarily on the notes and records and little, if at all, on how the patients are getting on. Others again will have seen medical officers employed under local authority obstructed or favoured in their work by questions of party politics or the personal ignorances or prejudices, likes and dislikes, of councillors and even of their families.

How far are these considerations "matters of prejudice" and how far are they "intellectual considerations, just or otherwise?" It is extraordinarily hard to decide, and probably each of us will have his own particular shade of opinion. There is no doubt they are very real, and must be taken into account in drawing up plans for any state service that is to turn out a success. Probably the argument that a state scheme would interfere with a patient's free choice of doctor is unsound. Under the National Health Insurance Act patients are free to choose their doctor, and there is no clear reason why they should not be equally free under any other state scheme. In any event the majority of the population is already limited to a choice between very few alternatives by purely geographical considerations. The choice of a consultant is even more limited. The patient will see either the only man in this district who specialises in his particular complaint, the specialist who happens to be holding a clinic on the day he is referred to hospital, or the consultant chosen for him by his family doctor. Few will make an entirely independent choice on sound lines. We all know the patient who likes to talk of "my man in Harley Street," or who goes seeking special advice guided in his choice by his lay friends rather than by his doctor, and not infrequently finds himself on the road to Endor.

The BMA give their answer to the difficulty in Recommendation I. They recommend that everyone shall be free to consult either the doctor he has selected under an official service, or privately for a fee any other doctor, whether a member of an official service or not. By no means everyone will agree that such a plan is either wise or ethical. It is intended so to avoid the splitting of the profession into two groups, the official and non-official. I can imagine, however, that it might cause far more embittered relationships between colleagues than the fact that one preferred to practise on his own and the other to serve whole-time in a state scheme. I have noticed no particular hostility between private practitioners and those who serve as medical officers of health or whole-time in hospitals or universities. On the other hand there is the question how far it is fair to allow doctors employed by the state to supplement their salaries by attending their colleagues' patients for a fee. To do so might well lay them open to temptation and ill-disposed criticism.

The argument that people will not value advice which they have not paid for directly probably only applies to a minority. The great majority of panel patients value the advice of their doctors, and there is a steadily increasing demand for the specialist services supplied by hospitals, where the payment, if any, is commonly made indirectly through a contributory scheme, or is purely nominal if the patient is very poor. Ratepayers are not backward in demanding treatment in municipal hospitals and clinics, and consultants in charge of outpatient departments cannot fail to be struck by the high proportion of patients they see there who could very well have afforded to pay a fee in private. It may be that they put less value on the advice they get when it is given for nothing, but they certainly seem to prefer it so.

Probably therefore on principle there is nothing against a whole-time salaried service, though there will certainly be a proportion both of patients and doctors who can never wish to restrict themselves within the limits of a state scheme. It is healthy and right that this should be. An all-embracing government service from which there was no escape or alternative for either doctor or patient would soon become infected with all those faults characteristic of institutions which have no stimulating opposition to keep them progressive and vigorous. By all means, therefore, let there be a section of the profession entirely outside the state scheme and engaged in private practice. They can be sure of a following, and their success or otherwise will be a direct indication of the efficiency and popularity of the state service. There need be no disastrous split in the profession provided a fair and reasonably easy method is devised whereby doctors can pass from one form of practice to the other. The details of such a method are entirely financial, and are some of the first that must be worked out if medical officers from the Services are to be attracted into the state scheme when they are demobilised; for many of them will have their savings locked up in the goodwill

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value of their practices and in their houses and surgeries. Fair compensation must be given for these.

If the state is to attract the best in the profession it must find a solution to these problems, and lay down conditions of work and organisation which appeal to the profession as a whole. Only so can it hope to establish a fully efficient service; and nothing less than this will satisfy the country. The difficulties are not of principle but of method and detail, and I hope and believe that a solution can be found for them on a basis of a whole-time salaried service.

W. A. LISTER.

CONDITIONS OF MEDICAL SERVICE

SIR,—In your issue of Oct. 23 a group of correspondents say that "the salary of the specialist should not be higher than that attainable by the general practitioner by virtue of experience or higher qualifications." If this means that all doctors in the new state service are to be paid alike, regardless of whether they are consultants or general practitioners, many of us will protest. All consultants hold higher qualifications and these should carry higher rates of pay.

I would suggest a basic pay for all. To this should be added allowances for (*a*) each extra diploma and (*b*) length of service. It might very properly be objected that it is more difficult to be a good general practitioner than a good consultant, but that few GPs desire to take a higher diploma (except perhaps MD) and so in fact would draw less pay than their colleagues in consulting practice with their many diplomas. Is it rash to suggest that a new diploma be instituted—a DGP (diploma in general practice)? Or even a fourth Royal College—a RCGP?

Queen Anne Street, W.1. C. ELGOOD.

GOING UNDERGROUND

SIR,—Dr. Millais Culpin, in his important letter in your issue of Sept. 25, raises the whole problem of the wrong and the right way of handling neurosis, whether of the individual or the mass variety as seen in industrial disputes. He illustrates from how small a beginning deep unrest may spring. Such knowledge cannot be too widely disseminated in time of war when stoppages of all sorts are catastrophic. Troubles are more liable to occur in war-time when the necessary deprivations and restrictions that accompany it cause men's tempers to become frayed. The present rough-and-ready methods of handling disputes are to be deprecated together with the unfortunate tendency on the part of authority, whether such be medical or lay, to ignore the psychological side of things and try to push ahead blindly with production. In their stead should be introduced a realistic and humanitarian approach to such matters. Were this to come about we should all be the happier, individually and collectively, not to mention the speeding up in production that would ensue.

As Dr. Culpin says, the case of the lad Page illustrates the wrong way to handle such problems. One who suffers from a fear of confined spaces should not be treated, without inquiry, as a malingerer or saboteur and forced to go down a pit, or even imprisoned for not doing so. In his case, it is stated that his fears had recently been reinforced by the sight of an older man brought up mangled from below. A difficult psychological relationship between son and father appears to lie behind such fear reactions and would need to be resolved by the state before it is entitled to ask him to become a miner.

Consciously or unconsciously, the miners recognise this fact and protest against Page's imprisonment, and the mishandling of his case by authority, in the only way that they know—by striking. To punish them in their turn is still more short-sighted and can only lead to widespread disaffection.

There is too great a tendency for the lay mind to accuse the psychologist of "spoiling the child" when he advocates removal of the individual from the source of his fears.

In industry generally, a strike threat is always the culminating sign of smouldering unrest—a protest on the part of the employee against some injustice that rankles, of which he may or may not be consciously aware. Unless this is investigated and put right, the danger of mass neurosis arises: reprisal measures can only make matters worse. The assumption by the employer or medical board of an attitude of omniscience and infallibility can lead nowhere. The employer and doctor, by reason of their own inner anxieties, are frequently possessed themselves of a psychological blind spot, and so are often unable to see or comprehend the underlying causes of unrest, due in the last instance to difficult environmental factors.

No man in his senses would expect his car to go forward when grit has got into the carburettor; common sense would teach him first to extract the grit. If the wheels of industry are to continue to revolve smoothly an exhaustive inquiry should be made into all the circumstances directly any tendency to a slowing down of effort manifests itself. A board should be constituted, comprising representatives both of employers and employees, assisted by a competent psychologist with experience of industrial disputes. The psychologist is needed because his eye is specially trained to observe such matters and his therapeutic technique is devised to get rid of friction.

Harley Street, W.1. CYRIL WILSON.

THROMBOCYTOPENIC PURPURA

SIR,—We have read with much interest Mr. Rodney Maingot's letter of Oct. 23. We have available the weights of the spleen in some of our cases. They are as follows:—

Removed at operation				Removed at necropsy			
Males		*Females*		*Males*		*Females*	
Age	Weight	Age	Weight	Age	Weight	Age	Weight
10	2¼ oz.	4	3¼ oz.	19	5¼ oz.	28	5¼ oz.
13	8 oz.	19	10½ oz.	11	2 oz.	32	9 oz.
13	6 oz.	34	2¼ oz.	46	9¼ oz.	40	6 oz.
3	1¼ oz.	46	5¼ oz.	..	..	54	8 oz.
23	1 lb. 7 oz.	44	1 lb. 2 oz.	..	..	69	4¼ oz.
						56	4 oz.

The two patients with the largest spleens (1 lb. 7 oz. and 1 lb. 2 oz.) were cured by splenectomy; the third largest had splenculi, and her symptoms persisted. There is no doubt about unremoved splenculi being a factor in relapse following splenectomy: but we have no evidence, either operative or necropsy, of splenculi being present in cases in our series apart from the ones we mentioned.

HORACE EVANS.
London Hospital, E.1. KENNETH M. A. PERRY.

THE CARIES-FREE MOUTH

SIR,—At medical inspections of 544 children of different age-groups drawn from 15 schools in South London I made a careful search for and inquiries about caries-free mouths; 6% of the children were caries-free, by which is meant, no caries present before or at the time of examination.

Of the	5 to 6	age-group,	13%	were caries-free.
,,	7 to 8	,,	2·2%	
,,	9 to 10	,,	6%	
,,	11 to 12	,,	5%	
,,	13 to 14	,,	2%	

I have no statistics for comparison but I believe these figures are an improvement on previous findings, and I submit them not for their intrinsic value, if any, but merely to call attention to the need for an inquiry into the reasons for this freedom from caries. Mellanby has shown that caries can be arrested and often prevented, but we still do not know why some children who eat what they like or what they can get have caries-free mouths. From a survey of my detailed notes I can do no more than form the impression that milk and/or cod-liver oil in adequate quantities, or the ability to tan, limit or prevent carious invasion, thus confirming in a haphazard way Mellanby's findings. In the older caries-free children the presence of tartar was too constant to be disregarded.

It may well be that caries-free children possess, manufacture or absorb something which other children lack, but at this stage it is wiser to make no comment. I would urge, however, that the study of caries-free

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mouths by a team of dental surgeons, biochemists, dietitians and social workers might produce far-reaching results and do more to offset the shortage of dentists than schemes for increasing the supply. It would, I feel sure, prove the soundness of Professor Ryle's constant appeal that the study of the healthy should keep pace with the study of the unfit.

Blackheath. GUY NEELY.

LEUCOCYTE COUNTS IN RADIUM WORKERS

SIR,—In your issue of Sept. 4 (p. 289) Dr. C. J. C. Britton drew attention to a low level of leucocyte counts occurring among healthy nurses of the Middlesex Hospital, not exposed to radium. I have also noticed this among nurses at Mount Vernon, and among normal young males beginning radium work and not connected with any hospital. It seems likely that this is a war-time effect, worth the while of some public body like the Ministry of Health to investigate, to see how far it extends in the population, and to seek its cause.

It is to be noted in Britton's counts that whereas 20·1% were below the level of 3000 polymorphs per c.mm., only 8·1% were below the level of 1500 lymphocytes. Thus the lymphocytes are much less effected. So by discarding the polymorph count and relying on the lymphocyte, it remains possible to rely upon blood-counts to determine whether workers should or should not continue handling X rays and radium. Several radium workers under my care have recently shown progressive falls in polymorph counts not accompanied by lymphocyte falls, and have been permitted to continue with their work.

I do not agree with Britton that weekly counts would solve the difficulty. Among radium workers the fall in leucocytes is to be detected not in weeks but in months or years, and could not thus be distinguished from the war-time effect to which he draws attention.

Mount Vernon Hospital, Northwood. J. C. MOTTRAM.

THE SIZE OF INFLUENZA A VIRUS

SIR,—Dr. Kenneth Smith's letter in your issue of Oct. 23 prompts me to mention briefly some experiments conducted, in collaboration with the late Miss Dora Lush, soon after American workers first intimated that they regarded the true size of influenza virus to be about 15 mμ. This figure was the outcome of studies with the virus propagated in 10-day-old hens' eggs, whereas earlier work with the virus obtained from the lungs of flu-infected mice had indicated a particle size 80–100 mμ. We accordingly analysed allantoic and amniotic fluids from eggs infected with influenza A virus, employing the methods of ultrafiltration and centrifugation. During the limited attention we could devote to the problem at that time, no evidence was found for the existence of the extremely small phase of the virus. Likewise, virus that had been precipitated with salmine and re-dispersed showed the same order of size as virus before such treatment.

It should also be mentioned that Friedewald and Pickles (*Proc. Soc. exp. Biol. Med.* 1943, **52**, 261) have recently reported having submitted influenza-infected allantoic fluid to centrifugation analysis, and, following a different technique from our own, find the size of the virus to be at least 60 mμ. Our values by two alternative centrifugation methods ranged from 60 to 90 mμ.

In my opinion, you were wholly justified in your criticism of the hasty acceptance of the small figure for the size of influenza virus by Dr. Smith in his generally admirable booklet *Beyond the Microscope*.

National Institute for Medical Research, N.W.3. W. J. ELFORD.

*** Current opinion as to the size of viruses is based upon the results of differential filtration through graded collodion membranes, centrifugation and at times optical methods; data so obtained by these three methods have on the whole yielded concordant results. Chambers and Henle have recently thrown doubt on the conclusions thus reached as to the size of influenza virus. The exact size of this virus is in itself relatively unimportant, but their claims, if correct, throw doubt on most of what is now accepted as to the sizes of viruses in general. The claims have, however, not yet carried general conviction, especially in this country.—ED. L.

HIPPURIC-ACID EXCRETION AND URINE VOLUME

SIR,—In your issue of Oct. 16 Major Allan Palmer, confirming the findings of Machella et al., reports a positive correlation between the amount of hippuric acid (HA) excretion and urine volume, using Quick's intravenous modification of the test. This was evident particularly in tests where the urine volume was below 150 c.cm. and he concludes that abnormally low HA values obtained in a urine volume below 150 c.cm. may be inaccurate. This conclusion, on the evidence presented, is open to criticism. It is a well-established fact,[1] not mentioned by either investigator, that patients with hepatic disturbances have a tendency to delayed excretion of water and oliguria. One would expect, therefore, to find a tendency to low urine volumes in association with low excretion of HA, both presumably being related to the same underlying disorder.

In my experience with the intravenous modification of the test, using Weichselbaum and Probstein's (1939) analytical technique, and giving 200 c.cm. of water at the time of the injection (as is recommended by Dr. Palmer), many patients and normals show "normal", and even "optimal" excretion of HA in the first hour despite urine volumes below 150 c.cm. and even below 100 c.cm. To consider a subnormal output of HA in a "low" urine volume as "inaccurate" seems to me objectionable, since the frequent association of low urine volumes with low HA output does not necessarily imply that the one directly causes the other. In fact, while I find, on plotting excretion of HA against volume in some 180 tests, a certain tendency for the low HA values to be associated with low urine volumes, the correlation is not strict. In follow-up studies with serial tests in individual patients the lack of correlation is striking, and it becomes clear that a large urine volume need not cause an increase in the output of HA or vice versa. To illustrate this may I quote the following data from five patients with gastric ulcer:

Case	Date in 1943	HA excretion (g. sodium benzoate)	Urine volume (c.cm.)	Case	Date in 1943	HA excretion (g. sodium benzoate)	Urine volume (c.cm.)
1	Feb. 15	0·76	208	4	June 1	1·02	240
	,, 18	0·74	134		,, 8	1·04	250
	,, 23	0·82	95		,, 11*	0·71	285
					,, 13	0·89	140
2	March 25	0·67	130		,, 15	1·06	87
	,, 28	0·78	580		,, 18	1·07	95
	,, 31	1·04	135		,, 23	0·94	245
	April 5	1·30	150		,, 27	0·99	265
				5	April 7	0·44	195
3	Oct. 8	0·62	155		,, 17	0·56	60
	,, 12	0·56	46		,, 19	0·67	164
	,, 16	0·54	40		,, 27	0·64	320
	,, 20	0·57	70		,, 6	0·72	175

* Post-op.

The observation of Machella et al. that induction of diuresis by say 1000 c.cm. of water before the test may increase the output of HA, requires closer study since no account was taken of possible spontaneous day-to-day variations in an upward direction. H. POLLAK.

NOT SO DREARY

SIR,—The conditions of service in the municipal hospitals controlled by the Middlesex County Council are admittedly excellent, but by no stretch of imagination can they be considered representative of the conditions prevailing in municipal hospitals throughout the country. The rateable value of the county of Middlesex is the highest in the world; therefore considerably more money is available for hospital development.

In the majority of municipal hospitals the position of the senior members of the staff has deteriorated steadily since the outbreak of war and now compares very unfavourably with the position of the majority of general practitioners.

I do not propose to waste space by going through the list of amenities mentioned in the letter of Dr. Avery Jones in your issue of Oct. 23, but I can safely say that in the average municipal hospital not one of them would be found to exist. ASSISTANT MEDICAL OFFICER.

1. Adler, A. *Klin. Wschr.* 1923, **2**, 1980; Adlersberg, D. *Wien. Arch. inn. Med.* 1934, **25**, 269.

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Obituary

CHARLES JOHN MACALISTER

M D EDIN., F R C P, T D

Dr. C. J. Macalister was for many years a notable figure in the social and medical life of Liverpool. Son of the ship-owner William John Macalister he was born and educated in the city for his father's calling, but persisting in his preference for medicine went to Edinburgh for his medical course, which he completed in 1884. Returning to Liverpool he married a daughter of Dr. William Carter, at that time senior physician to the Royal Southern Hospital, a position to which Macalister in due course succeeded, holding it until 1925. Throughout this long tenure he was associated with Robert Jones and Thurstan Holland, the radiologist, and on terms of close friendship with both. Macalister was attracted to the problems of what is now coming to be called child health, and from quite an early period of his career he and Robert Jones saw the importance of treating city children in country surroundings, both with a view to prevention of disease and its cure when that implied a long period of hospitalisation. Out of this arose the hospital at Heswall, now incorporated in the Royal Liverpool Children's Hospital. In many other directions Macalister's active mind was constantly feeling out for the solution of fundamental problems in the origin and treatment of disease. He was one of the earliest to recognise the value of ultraviolet therapy. He also worked for long at the stimulation of healing of wounds and (with Benjamin Moore) at the possibility of anti-neoplastic factors in the embryo and young infant. He may not have had spectacular success in either of these difficult fields, but undoubtedly his questing mind was a stimulus to his fellow workers. Intense loyalty to the hospital which was his professional home led him to compile, and publish in 1936, its *Origin and History*, a volume of 200 pages containing portraits and personal reminiscences, modestly concealing his own share except to mention that it was he that started children's outpatients and prompted the rebuilding of the pathological department. Macalister made friends with apparent ease in many different spheres. For this no doubt he had to thank his gracious personality, his kindliness of nature, and the social charm and humour which unfailingly drew about himself any group in which he moved. In the early years of the last war he married his second wife, Miss Leslie Stalker. There were two daughters of this marriage, of whom the elder qualified last year and was house-surgeon at the Royal Southern. Although his health had been failing for some time and he had been living in retirement at Bourton-on-the-Water, the loss of such a vivid personality will be widely felt. He died there on Oct. 25.

From a portrait by Frank T. Copnall

WILLIAM ROLLAND

M D GLASG.

Dr. William Rolland, physician and pathologist to the Bolton Royal Infirmary, died on Oct. 15 at the age of 59. After qualifying at the University of Glasgow in 1905 he was for a time assistant to Sir Robert Muir at Glasgow, and then on his appointment to the staff of Bolton Royal Infirmary in 1911 at once started a one-room laboratory at the hospital. Today the department of pathology is housed there in up-to-date laboratories. Rolland also worked hard as a physician to the hospital and proved himself a careful and conscientious clinican. He was interested in diseases of the chest and published papers on acute pulmonary œdema and on purulent bronchitis in our columns. But his real enthusiasm was for pathology, and especially bacteriology. During the last war he served in France as bacteriologist to the 24th General Hospital, BEF.

Dr. Rolland leaves a wife and a son, who is a medical student in his final year. A younger son was lately killed on active service with the RAF.

JOHN HAROLD BEDLINGTON ROUND

M B CAMB.; CAPTAIN RAMC

NEWS has been received of the death in Persia of Captain J. H. B. Round at the age of 30 from nephritis. He was the only son of Mr. and Mrs. Harold Round of Edgbaston, Birmingham, and was educated at West House School, Greshams, and Pembroke College, Cambridge, where he was secretary to the Cambridge Medical Society. He won an entrance scholarship to Westminster Hospital and after graduating in 1938 he served as house-physician to Sir Stanley Woodwark. Round returned to Birmingham as the first medical officer of an aero factory to organise the medical services. Later he became medical officer of a group of factories in the Midlands and held this position until he joined the RAMC in August, 1941. In November, 1942, he was posted to Persia and served there till his death. His great hobby was motoring and he had taken part in many reliability trials. He married Miss Brenda Johns of Putney.

GEORGE ERIC CAMPBELL PRITCHARD

M D OXFD, F R C P

Dr. Eric Pritchard died at Exmouth on Oct. 20 in his 78th year. With his death the pædiatricians of this and other countries lament a good friend; more than that, the children of the British Isles have lost one of their traditional champions.

He was a link, writes D. P., between the voluntary hospital pædiatrician and the public health pædiatric service. No one who worked with him at the Infants Hospital in Vincent Square could help but be impressed by the number of ailing infants sent for his advice by welfare officers from all over the country who had supreme confidence in his ability to help them and solve their problems. He was not only a pioneer in infant feeding, but his views were often so far in advance of current teaching that they failed to command the attention and respect which they afterwards proved they deserved.

In his recognition of the vitamins he was 20 years ahead of the times. Looking back, one can say with assurance that he was the first pædiatrician in this country to appreciate the fact that infant feeding was more closely related to the weight than the age of an infant and the phrase "expected weight" was one which he coined himself. To hear him question a mother as to how she fed her infant, how often, how she made up the feed and administered it, and then point out to his students where the fault lay was to realise that he was a master of the subject, and his directions to the mother on the method of handling, managing and feeding her infant were those of an artist. His outlook was wide and his influence on the preservation of good health in infancy was exercised through the huge classes of welfare workers who attended his lectures, both at Vincent Square and at the headquarters of the national associations at No. 117, Piccadilly. There he would discuss the weekly weighing of infants, the value of breast feeding, the virtues of dried milk versus fresh milk, fruit juice, cod-liver oil and other vitamins, the shortage of calories and the technique of the infant's care. He made the whole subject fascinating and vital; it has been said that he rescued infant feeding from its association with the fly-blown milkjug to make it a thing of science and art. Of several widely read books through which his teaching took effect the *Physiological Feeding of Infants* was the most ambitious. He had advanced ideas on the teaching and training of midwives in their care of the new-born and when appointed to Queen Charlotte's as their first pædiatrician, he revolutionised

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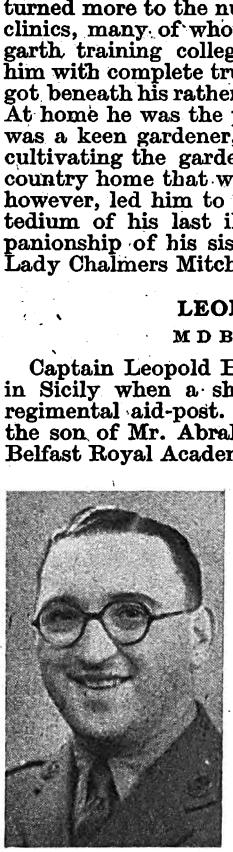
the care of the infant in that great maternity hospital. His views on children's diseases were less orthodox.

George Eric Campbell was one of the gifted family of Charles Pritchard, DD, Savilian professor of astronomy at Oxford, to whose early training he owed his habit of exact thought and organising ability. He did well at Clifton College before entering Hertford College, Oxford, where he took honours in physiology, pursuing this study at Berlin in vacations, and he qualified from St. Mary's, Paddington, in 1892. After house appointments there and some experience of general practice in South Kensington he found his bent as physician to the St. Marylebone General Dispensary, where he initiated the first infant welfare clinic in London. At this time he was also on the staff of the Queen's and outpatient physician to the City of London Hospital. From 1922 to 35 he was medical director of the Infants Hospital in Vincent Square and later was attached as pædiatrician to Queen Charlotte's. In 1934 he was president of the British Pædiatric Association. All his medical work was firmly based on physiological principles and it was radiant health that appealed to him, whether in the glossy coats of the cairn terriers which he reared or in the firm flesh and rosy colour of the countless babies who owed him their lives. It was noteworthy that while he was rather strict with the mothers their children regarded him without alarm. He had a certain Puckish humour and could on occasion use a caustic wit. Those who played games with him—and he took them mighty seriously—might miss the kindlier side of his nature which was turned more to the nurses, health visitors and helpers at clinics, many of whom (including the staff of the Wellgarth training college) combined a deep affection for him with complete trust in his skill. But colleagues who got beneath his rather shy exterior found a heart of gold. At home he was the perfect host, full of anecdotes. He was a keen gardener, spending week-ends planning and cultivating the garden at Burnham Beeches around his country home that was to be. His wife's failing health, however, led him to retirement at Exmouth, where the tedium of his last illness was mitigated by the companionship of his sisters, Lady (Bretland) Farmer and Lady Chalmers Mitchell.

LEOPOLD HERBERT

M D BELF; CAPTAIN RAMC

Captain Leopold Herbert was killed on active service in Sicily when a shell landed directly on top of his regimental aid-post. He was born at Lurgan in 1912, the son of Mr. Abraham Herbert, and educated at the Belfast Royal Academical Institution. He graduated in medicine from Queen's University, Belfast, taking his MD four years later. After qualification he held a house-appointment at the Guest Hospital, Dudley, later becoming assistant medical officer at St. Stephen's Hospital (LCC) and senior assistant medical officer at the Beverley Road Hospital, Hull. Prof. W. W. D. Thomson, under whom he worked in Belfast, writes: Leo Herbert's pleasant smile and cheery face, his keen interest and spontaneous enthusiasm in all his work marked him out in the ward or classroom. After he qualified he retained the student habit, and on his return to Belfast while houseman in English hospitals he never failed to pay a visit to his home hospital to discuss some case which had been of special interest or had presented some puzzling feature.



Herbert joined up at once on the outbreak of war and had seen service in many parts of the world. He was on board a troopship taking part in the evacuation of Singapore and went through the last North African campaign as a regimental medical officer. His commanding officer writes of him as a "cheerful, useful, brave and efficient" doctor who could be relied on to do excellent medical work no matter how difficult the circumstances.

Notes and News

MEDICINE AND INDUSTRY

A STRONG case is needed to justify producing a new journal at this stage of the war. Such a case is forthcoming for the *British Journal of Industrial Medicine* which is to be published quarterly, from next January, by the British Medical Association. Industrial medicine has gained in immediate importance in the past four years; yet its exponents still have no journal in this country devoted to their problems. The Association of Industrial Medical Officers has been keenly aware of the need and the opportunity, and the new journal, besides printing 'original work, abstracts and reviews' will record the proceedings of the association and its component groups.

Sir Henry Bashford has been giving much time to the new venture, but his appointment to the Treasury, recorded on another page, now prevents him from being editor-in-chief. It is anticipated that Dr. Donald Hunter will take his place, the other editors being Dr. A. J. Amor, Sir Henry Bashford, Dr. M. W. Goldblatt, Dr. D. C. Norris, Dr. Donald Stewart and Mr. R. W. Watson-Jones, assisted by an editorial board comprising Lieut.-Colonel G. S. Parkinson, Dr. J. C. Bridge, Lieut.-Colonel G. P. Crowden, Professor Millais Culpin, Sir Arthur Hall, Dr. D'Arcy Hart, Sir Wilson Jameson, Dr. R. E. Lane, Dr. E. R. A. Merewether, Air Vice-Marshal Sir David Munro, Dr. R. S. F. Schilling, Dr. E. H. Strange, Dr. H. M. Vernon and the Editor of the *British Medical Journal*.

COMMUNAL FEEDING

THE first attempt to take stock of the position of civic or communal restaurants has recently been undertaken by a research group of the London Council of Social Service,[1] under the direction of Mr. F. Le Gros Clark. Out of some 2000 of these restaurants, spread unevenly through the country by the spring of 1943, 281 were within the London area, 46 of them directed by voluntary committees. The council chose for their survey 41 of the voluntarily conducted restaurants; and 1220 customers (about 10% of the clientele) answered a series of questions directed to ascertain how far the restaurants have a permanent value apart from their use as a war-time measure. About 85% of the diners, it seems, were regular customers, representative of adults of all ages and both sexes, with a growing proportion of office and professional workers. A considerable number of the women now go out to work for the first time, and were formerly in the habit of taking their meals at home. About 27% of the clientele had previously taken sandwiches to work with them, and the report says that there must be at least 200,000 people in the country as a whole who are saved from the monotony of a carried lunch by the civic restaurant service. Some 40% formerly lunched in commercial restaurants or cafés, a fair proportion of which have closed since 1940, the communal restaurants probably doing little beyond filling the gap. Meals for aged people, many of them old-age pensioners, are provided at a reduced price, several of the restaurants allotting a special table or a special time to the pensioners. These old people welcome a hot meal served by a considerate staff and taken in company with their neighbours, instead of a lonely snack in a single room. Nearly all the diners expressed a wish that the restaurants should continue after the war, reasons for appreciation varying from convenience, comfort, quick service, cheapness, cleanliness, lack of class distinction, to pleasure, often expressed, at the quality of the food served. The most popular dish was meat, though a growing taste for salad dishes was found in several restaurants. The atmosphere is democratic and homely, and the meals are selected by people with an eye to the dietetic interests of their customers.

If some similar provision is to be carried on after the war, the restaurants must obviously be able to pay their way. The investigators discovered that the determining factor in financial success is the turnover, the lowest annual turnover sure of showing a favourable balance being £3000. Premises are also important: most of the restaurants are now in premises which will revert to their original owners—church halls, shops, private houses, club buildings and the like. It seems probable that special premises designed for the purpose would have to be established, and this contingency should be faced in good time.

1. The Communal Restaurant. From the secretary, 7, Bayley Street, London, W.C. 1. Pp. 36. 6d.

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Royal College of Physicians of London

At a comitia of the college held on Oct. 28, with Lord Moran, the president, in the chair, Dr. John Parkinson, Dr. George Riddoch, Dr. Henry Cohen and Dr. Janet Vaughan were elected councillors. Dr. C. M. Hinds Howell was elected representative on the committee of management of the Conjoint Board, Sir Comyns Berkeley on the council of the Central Midwives Board, and Dr. Otto May on the British Social Hygiene Council. Sir Edmund Spriggs was appointed Harveian orator and Dr. C. Bruce Perry Bradshaw lecturer for 1944, and Dr. H. Stanley Banks Milroy lecturer for 1945. The Jenks scholarship was awarded to D. G. M. Hills, late of Epsom College.

The following were admitted to the membership:

Enid I. M. Addenbrooke, MB BIRM., Christopher Bastible, MD NUI, J. A. Black, MB CAMB, Joyce L. Chamberlain, MB LOND., P. J. Collard, MB LOND., A. H. C. Couch, MB LOND., D. M. Dunlop, MD EDIN., FRCPE, Paul Forgacs, MB LOND., O. F. Garai, LRCP, Louis Greenfield, MB LOND., Philip Harvey, MB LOND., W. H. Helm, LRCP, Purser Jones, MB LPOOL, surgeon lieutenant RN, H. A. Leggett, MD LOND., flight-lieutenant RAF, V. C. Medvei, MD VIENNA, LRCP, F. T. Page, MB LOND., J. A. F. Roberts, MD, D SC EDIN., surgeon lieutenant, RNVR, Alan Wardale, MB LOND., FRCS, squadron-leader RAF and David Weitzman, MB LOND.

Licences to practise were conferred upon the following 197 candidates (173 men and 24 women) who have passed the final examination of the conjoint board and have complied with the by-laws of the college:

A. R. Anderson, P. R. Apperly, P. G. Arblaster, P. E. Baldry, M. A. Basker, K. H. Bassett, J. S. Battersby, W. C. H. Bell, S. B. Bennett, W. E. J. Bennett, Leonard Bernstock, G. E. R. Bibbings, H. R. Blades, R. A. Blyth, L. S. A. Boothroyd, M. P. Bourke, W. M. de C. Boxill, R. S. Bradbrook, P. R. Bromage, V. S. Brookes, D. H. Broughton, A. E. Brown, W. F. Buchanan, Dora Buckley, R. R. Burn, Dennis Canter, A. H. D. Capper, Eileen M. Carey, R. M. Chambers, F. B. E. Charatan, P. A. H. Clements, E. R. Cole, Lorna Cooke, Margaret L. Cox, K. D. Crow, S. M. F. Curé, M. J. Cutler, Paul Dawson-Edwards, R. F. A. Dean, E. W. Deane, Frank Denny, C. J. Dewhurst, R. I. Dixon, K. W. Dodd, M. C. H. Dodgson, Cyril Dryburgh, D. J. Du Toit, G. C. D. Dutton, J. R. Dyer, C. G. Edwards, E. M. Edwards, A. G. Ellerker, Lionel Erin, Maurice Ernest, D. H. L. Evans, Elinor M. Evans, R. H. J. Fanthorpe, S. C. Farman, A. D. J. Farquharson, D. A. Fermont, J. H. Ferries, J. J. Fleminger, Mary Francis, G. J. F. Fryer, C. O. Fung-Kee-Fung, Y. Y. Gabril, R. B. Gaze, Sidney Gee, L. M. Gerlis, E. C. Gibson, K. L. G. Goldsmith, R. A. Goodbody, L. N. Gould, M. G. Gould, K. T. Graham, Graham Grant, C. J. S. Green, Sheila M. E. Grew, G. A. Griffin, E. G. Hall, Thomas Hanley, F. S. Harlow, A. D. Harris, J. N. Harris-Jones, R. H. Heptinstall, A. J. H. Hewer, Eva M. I. Hick, Reba N. G. Holloway, J. C. S. Holmes, J. W. Honey, J. E. Hotchin, Sheila M. Howarth, Lilian Howell, R. A. Hudson, P. H. Huggill, J. R. Ivey, R. F. Jackson, H. B. Jacobs, Bronwen R. James, G. M. L. James, F. W. Johnson, G. T. Johnson, D. G. Jones, P. F. Jones, P. H. Jones, W. K. Jones, A. J. Jordens, E. C. B. S. Keat, H. B. Kelly, P. H. Keppich, Irene S. King, Arthur Knight, Tecklim Koonvisal, R. H. N. Lake, Joan E. M. Lambert, P. G. Large, B. M. Laurance, M. S. Laurie, Samuel Levy, Ninian Lewis, W. D. Linsell, Patricia M. Lloyd, J. A. Loveless, Margaret E. Lowry, Gerald MacGregor, B. H. McGuirk, K. M. Mackenzie, R. M. Mackenzie, Anne I. Mackessack, S. A. Marsh, W. E. S. Marshall, R. G. May, J. R. M. Miller, K. H. Miller, R. D. Millward, M. E. Minchin, Ruth S. Mitchison, G. O. Morgan, I. F. K. Muir, N. I. Nash, Eugene Nassau, G. A. Nell, M. S. Novis, J. E. Oliver, J. M. Pallot, Diana G. Paradise, J. P. Partridge, A. D. Payne, J. O. Pearson, B. J. Peck, H. P. Phillips, R. M. Phillips, Pauline M. Philpott, Mildred I. Pott, C. A. Pragnell, J. E. L. Price, V. W. Pugh, Denise A. Pullen, Celia M. Rapport, D. A. C. Reid, J. J. Rivlin, J. W. Robb, D. G. Roberts, M. M. Rose, Donald Rosonberg, M. H. Russell, N. H. Seaton, D. L. Scott, Morris Seifert, J. C. Selnes, J. H. Sherrey, L. S. Simons, K. H. Smith, W. H. Smith, J. L. Souster, Ethel M. Spedding, I. F. R. Sutherland, C. E. Sweetnam, K. B. Thomas, D. W. Townley, J. R. Trounce, K. A. D. Turk, H. R. Vincent, B. A. Ward, J. S. Watson, W. A. Watson, P. L. Watts, John Wedgwood, G. P. West, R. G. White, T. A. White, K. C. Willett, H. B. L. Williams, O. H. E. Williams, T. C. P. Williams, A. M. Wood, and C. F. Ziervogel.

Diplomas in child health were granted jointly with the Royal College of Surgeons to the candidates named in our issue of Oct. 23 (p. 528).

Prize in Anatomy

Major George Waddington, of Collingham, and Guy Waddington, of Halifax, bequeathed their bodies to the anatomy department of the medical school of Leeds University. A group of their relations and friends have now endowed a prize in their memory. The Waddington prize will take the form of books presented to the most promising student in the junior anatomy class.

Food Education Society

At 3 PM on Monday, Nov. 15, at the London School of Hygiene, Keppel Street, W.C.1, Prof. J. R. Marrack is to give a lecture on food and the postwar world.

Medical Society of London

At 4.30 PM, on Monday, Nov. 8, the society will meet at 11, Chandos Street, W.1, to discuss surgery of the nerve gap. Prof. H. J. Seddon is to be the opening speaker.

University of London

The faculty of medicine have elected Mr. J. B. Hunter to be their dean for the remainder of the period 1942–44 in place of Sir Girling Ball who has resigned.

University of Glasgow

On Oct. 23 the following degrees were conferred:

MD.—Gilbert Forbes (with high commendation), G. G. Robertson (with commendation), I. S. McGregor and Elizabeth A. Marshall.

MB, B Ch.—D. M. Mackay, R. C. Curran, William Phillips, R. S. Duff, Charles Brown, May B. Paterson, W. M. Lancaster, T. D. V. Lawrie, J. C. C. Kelly (with commendation); George Anderson, M. C. Anderson, J. A. Barclay, J. B. Barr, W. P. Barr, John Bell, J. A. G. Bisset, J. J. Bissett, Katherine H. Broadfoot, A. S. Brodie, A. K. Brown, G. S. Brown, Margaret T. Brown, Robert Brown, A. S. Caldwell, Catherine P. Cathcart, J. S. Chapman, E. A. Chisholm, Catherine E. P. Clark, J. B. Clark, J. A. Clarke, G. M. Crawford, Agnes M. K. Culver, William Cunningham, A. B. M. Currie, Hamilton Currie, Thomas Dunbar, A. M. Fairlie, Isabella M. B. Forbes, May C. Forbes, J. M. Fowler, James Fraser, J. M. Fraser, Samuel Galbraith, J. D. Galletly, J. B. Geates, G. S. Hargrave, James Harper, Cecil Harris, J. T. Hutchinson, J. S. F. Hutchison, Mary C. Keter, H. A. Lang, T. L. Linn, Archibald Low, Doris A. R. Lunn, Malcolm Macaulay, A. G. McCarey, Donald McColl, A. M. McDonald, W. C. MacDonald, James McDowall, Agnes E. Macfarlane, Margaret C. McGowan, Agnes M. Macgregor, A. G. Mcgregor, Margaret W. Macgregor, William Macintyre, Angus Mackay, Elizabeth M. Mackie, N. C. Mackillop, Mary B. MacKinnon, Iain Macleod, D. A. Macpherson, Janet E. McPherson, Norman McSwan, J. F. Mair, Marcus Marlborough, J. J. Marlow, Dorothy M. Marshall, Margaret Marshall, John Mathieson, R. S. Menzies, Margaret H. Miller, R. M. Mitchell, H. H. Morrison, D. E. Munro, H. G. Munro, Margaret E. Munro, William Murray, Alys P. Nelson, Charlotte S. Nimmo, J. H. Noble, Rosemary O'Hare, H. M. Owen, G. W. H. Paterson, Marjorie M. Paterson, I. F. Pirie, E. J. R. Primrose, I. H. R. Rae, Jessie M. Ramsay, T. A. Ramsay, D. A. Rawson, Jessie P. M. Robertson, A. F. Ross, Agnes R. Russell, Sheenah J. M. Russell, J. G. Scott, I. R. Simpson, D. H. Singleton, G. A. Smart, T. G. Smillie, Anne L. S. C. Smith, F. G. M. Smith, J. M. Sutherland, John Telfer, John Thompson, W. A. Todd, D. C. Watt, T. A. Watt, David Wightman, George Will, James Williamson, T. A. Wylie and Nora Yates.

Scottish Conjoint Board

At recent examinations of the board of the Royal Colleges of Physicians and Surgeons of Edinburgh, and the Royal Faculty of Physicians and Surgeons of Glasgow, the following were successful:

LRCP & SF, LRFP & S

A. C. Austin, F. St. M. Brett, E. D. Cameron, Margaret R. Connolly, M. C. Fitch, Ernst Frischler, Ellis Glekin, Elizabeth G. Hood, J. G. Levack, I. M. Lourie, S. R. Maraj, J. W. Muggoch, D. J. P. Naismith, Elizabeth R. B. Polland, J. T. Richardson, Frances Selesnick, A. M. Shokry, H. M. Steel, and A. D. Willox.

The following graduates of recognised foreign universities were also admitted to the licentiateship:

Karl Friedmann, MD, Vienna, G. W. Green, MD, Brux., Ruth Meier-Blaauw, MD, Breslau, and G. M. Weiss, MD, Bologna.

Royal College of Obstetricians and Gynæcologists

At a meeting of the council on Oct. 23, with the president, Sir William Fletcher Shaw, in the chair, Prof. J. J. Kearney was elected to the membership. The following were also admitted to the membership: J. K. Baker, Johan Kruger, and Katharine I. Liebert.

It was announced that the donor of 1000 guineas to commemorate the presidency of Sir William Fletcher Shaw wished the interest to endow a lecture every second year to be given alternately by a member of the college on infertility, and by a gynæcologist from the USA as an expression of the friendship between our two nations. At the end of the meeting, Prof. Daniel Dougal assumed the office of vice-president and Mr. Eardley Holland that of president. A vote of appreciation for the services of Sir William Fletcher Shaw was adopted.

The following have been awarded the diploma of the college:—

Agnes U. Campbell, W. H. Carlisle, J. T. Carroll, J. M. Corston, Margaret C. S. Crocket, R. W. Danziger, Grace T. Dawson, Mary E. Egerton, Charlotte L. Hess, P. C. Lewis, Eileen C. Miller, Mary L. Neville, Mary P. Short, J. W. H. Simpson, Esther M. Swinnerton, J. W. Totten, and A. H. C. Walker.

Tuberculosis Association

A meeting will be held at 26, Portland Place, London, W.1, at 3.15 PM on Friday, Nov. 19, when Dr. O. Galtung-Hansen, of the Norwegian public-health service, and Lieut.-Colonel C. F. Bennett, RCAMC, will open a discussion on immunity-producing measures in tuberculosis.

Pharmaceutical Society of Great Britain

Mr. M. A. H. Tincker, D SC, keeper of the laboratory of the Royal Horticultural Society, is to speak on the use of plant-growth substances at the house of the society, 17, Bloomsbury Square, London, W.C.1, on Thursday, Nov. 11, at 7 PM.

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New Appointments

Sir Henry Bashford has been released from the post of chief medical officer to the Post Office to take up a new appointment as Treasury medical adviser. Dr. W. L. Scott, second medical officer to the Post Office, succeeds Sir Henry as chief medical officer, and Dr. C. G. Roberts, an assistant medical officer, becomes second medical officer.

Dr. Scott, who is 55 years of age, was educated at Glasgow High School, the University of Glasgow, and University College, London. He graduated MB Glasg. in 1911, and after holding house-appointments at the Sheffield Royal Infirmary was appointed assistant medical officer at Chelsea Infirmary and the North Western Fever Hospital. He served throughout the whole of the last war and was awarded the MC in 1917. In 1919 he became a medical member of a pensions appeal tribunal. He joined the staff of the Post Office in 1921 and was appointed to his present post in 1934.

Dr. Roberts is 37 and was educated at Uppingham College. He qualified from the Westminster Hospital in 1930, taking his Cambridge MD in 1939. He was a resident physician at Ruthin Castle before joining the Post Office staff in 1934.

Royal Society of Medicine

On Tuesday, Nov. 9, at 2.30 PM, at the section of experimental medicine and therapeutics, Prof. A. Fleming, FRS, Prof. H. W. Florey, FRS, Flight-Lieutenant D. C. Bodenham, Colonel E. C. Cutler, USAMC, Mr. R. Vaughan Hudson, and Prof. R. V. Christie will open a discussion on penicillin. Afterwards Professor Florey will show a film on the use of penicillin in the treatment of war casualties. At the same hour, at the section of psychiatry, Dr. E. S. Stern will speak on acute confusional insanity and delirium, and Dr. M. N. Pai on neuropsychiatric after-effects of cerebrospinal fever. On Nov. 10, at 5 PM, Dr. Cuthbert Dukes will give his presidential address to the section of proctology on the surgical pathology of rectal cancer. The clinical section will meet at 2.15 PM, on Nov. 12, at St. Mary Abbots Hospital, Kensington, W. 8. At 5 PM, on the same day, at the section of ophthalmology, Prof. Arnold Sorsby will read a paper on the incidence and treatment of ophthalmia neonatorum.

Socialist Medical Association

At a conference on a national service for health held on Oct. 17, Mr. HECTOR MCNEIL, MP, said that many doctors were afraid that such a service would lead to an increase in bureaucracy and red-tape; some such increase was, he feared, inevitable, but it could not come between the doctor and his responsibility for his patient. He mentioned, as an example, the decision of the Glasgow city council that homœopathy and other unorthodox methods of treatment should, as an experiment, be applied to patients in the city's fever hospitals. But the city's chief medical officer had made it clear that once a patient entered a hospital he became the responsibility of the medical staff only; and the project was abandoned. Mr. SOMERVILLE HASTINGS, FRCS, stressed the point that the only way to improve the standard of general practice was for doctors to work together in groups or teams. Dr. HORACE JOULES, the chairman, said he was a whole-time salaried practitioner and no money on earth would lure him to Harley Street—even if Harley Street was prepared to try and lure him. A speaker from the floor of the house criticised the salaries offered to doctors in municipal service, and urged the SMA to publish a salary scale; if this was really comparable with the earnings of private practice, he felt that much of the doctors' opposition would vanish.

Mass Radiography Film

The National Association for the Prevention of Tuberculosis has produced a short sound film about mass radiography, to show to office and factory staffs, managers, shop stewards and others before these examinations are to be made. It is thought that an advance view will help them to form a correct idea of what mass radiography is, disarm criticisms from management and workers and ease the complicated procedure of passing the subjects in and out of the X-ray room. The film is available in 16 mm. and 35 mm. size (non-flam) and lasts for twelve minutes. Further particulars may be had from Dr. Harley Williams, NAPT, Tavistock House North, Tavistock Square, London, W.C.1.

Dr. Russell J. Reynolds has been appointed honorary X-ray consultant to the directorate of medical supplies, Ministry of Supply.

THE German minister of the interior has issued a circular (*Reichsgesundheitblatt*, Aug. 4, 1943, p. 524) cancelling the marriage health decree that members of the Wehrmacht and their fiancees must present a medical certificate that they have had a Wassermann test.

Medical Casualties

The following medical casualties have been announced:

Missing.—Surgeon Lieut.-Commander Hugh de L. N. Davis, BM OXFD, RNVR, HMS *Charybdis*; and Lieutenant R. A. Palmer, MB CAMB., RAMC, parachute field ambulance.

Wounded.—Captain Gerald Bryne, MB BELF, RAMC, and Major A. F. Wallasey, MB LOND.

Middlesex County Medical Society

A meeting will be held at the West Middlesex County Hospital, Isleworth, on Tuesday, Nov. 9, at 2.45 PM. After a clinical demonstration Mr. W. J. FERGUSON will speak on treatment of hæmetemesis and malæna in cases of recently perforated peptic ulcer, and Mr. D. M. STERN on the treatment of stress incontinence in women.

Royal Institution of Great Britain

On Nov. 26 the Friday evening discourse will be given by Sir Joseph Barcroft, FRS, who will speak on the preservation of foods by drying, and on Dec. 10 by Prof. H. W. Florey, FRS, who will speak on penicillin and its development for medical uses. Both lectures are to be at 5 PM. On Tuesdays, Nov. 2, 9, 16, at 5.15 PM, Sir Henry Dale, FRS, is to describe our progress in the treatment of infections, and at the same hour on Nov. 23, 30, Dec. 7 and 14 Prof. J. C. Drummond, D SC, will lecture on food problems of the postwar years. Further particulars may be had from the secretary of the institution, 21, Albemarle Street, London, W.1.

Appointments

BAER, PAUL, MD MILAN, LRCPE, DTM & H: surgical registrar at the Bristol Royal Infirmary.

NYE, C. W., MB GLASG.: examining factory surgeon for Beverley, Yorks.

Births, Marriages and Deaths

BIRTHS

BINNING.—On Oct. 28, at Cuddesdon, Oxon, the wife of Captain J. S. Binning, RAMC—a son.

CRITIEN.—On Oct. 3, at Malta, the wife of Surgeon Lieut.-Commander G. R. Critien, RN—a son.

JAMESON EVANS.—On Oct. 28, at Bromsgrove, the wife of Mr. Philip Jameson Evans, FRCS—a daughter.

LAYCOCK.—On Oct. 31, at Halifax, the wife of Dr. F. J. Laycock—a daughter.

MCDONALD.—On Oct. 23, at Oxford, the wife of Lieutenant D. A. McDonald, RAMC—a son.

OGILVIE.—On Oct. 29, at Canterbury, the wife of Dr. J. D. Ogilvie—a son.

SCHIER.—On July 18, at North Battleford, Saskatchewan, the wife of Squadron-Leader R. I. Shier, MB, RAFVR—a son.

TANNER.—On Oct. 26, in London, to Dr. Evelyn Tanner, wife of Mr. Norman Tanner, FRCS—a daughter.

MARRIAGES

HOOD—EARP.—On Sept. 17, at Wolverhampton, Holland Hood, MB, lieutenant RAMC, to Margaret Earp.

REES-JONES—WILLIAMS.—On Oct. 23, at Quedgely, William Tudor Rees-Jones, surgeon-lieutenant RNVR, of Swansea, to Molly Williams.

STOWELL—BRADFIELD.—On Oct. 23, in London, Eldon Stowell, BM, to Hilda Mary Bradfield, section-officer WAAF.

VAN ESSEN—TROTTER.—On Oct. 23, in London, William Maurice Van Essen, MRCS, to Janet Clark Trotter, MB.

DEATHS

ANDERSON.—On Oct. 28, at Cardiff, William Campbell Anderson, MD ABERD, DPH.

GUNTHER.—On Oct. 28, at Hampton Wick, Hermann Arthur Gunther, MB LOND, aged 71.

HOPKINS.—On Oct. 26, Charles Hensley Hopkins, MRCS, major, RAMC ret., of Ryelands, Weymouth.

MACALISTER.—On Oct. 25, at Bourton-on-the-Water, Glos. Charles John Macalister, MD EDIN, FRCP, aged 82.

POYNTON.—At Bath, Frederick John Poynton, MD LOND, FRCP, aged 74.

SARGENT.—On Oct. 27, William Gostwyck Sargent, LSA, LMSSA, of Padstow House.

WAIN.—On Oct. 25, Jack Arthur Wain, MB WITWATERSRAND, FRCSE, DMR, assistant medical officer at the Christie Hospital and Holt Radium Institute, Manchester.

WILLOCK.—On Oct. 10, at Exeter, Edward Hulse Willock, MRCS, LSA, former regional officer for the Ministry of Health.

The Index and title-page to THE LANCET, Vol. I, 1943, which was completed with the issue of June 26, is ready today. A copy will be sent gratis to subscribers on receipt of a post card addressed to the Manager, 7, Adam Street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive indexes regularly as published should do so now.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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ORTHOPÆDIC INFLUENCE ON THE TREATMENT OF FRACTURES

A CLINICAL STUDY *

G. R. GIRDLESTONE, BM OXFD, FRCS
CONSULTING ORTHOPÆDIC SURGEON, WINGFIELD-MORRIS HOSPITAL, AND RADCLIFFE INFIRMARY, OXFORD

ONCE in his two years' term of office you encourage your president to talk to you without restraint, hoping, of course, that he will choose some subject appropriate and timely. I want to talk to you about the treatment of fractures in this country, to tell you how I think we can help to raise the general standard, and then to follow some lines of thought on clinical problems in this field.

As I shall soon be finding fault and proposing remedies, you may well ask for evidence of my competence as a judge and a reformer. The best answer I can give is that close on 30 years ago I found a job after my own heart under great leaders and in good company. For shortly before the first great war I came in contact with Robert Jones and Agnes Hunt at Baschurch, and soon found myself heavily infected with orthopædics. My orthopædic education has fallen into three phases, those of the two wars and the time between.

In the first great war burrowing sepsis, shattered bones, and extensive loss of soft parts presented every kind of orthopædic problem.

In the twenty years between the wars I had ample opportunity of applying to fractures and to every sort of complication and failure the principles of orthopædic surgery which I was beginning to understand.

Then came the present war, in which one side of my work has given me a comprehensive view of the treatment of accidents in the hospitals of six counties. Only here and there have I found a hospital with a good accident service, although the case for such a service has been proved to the hilt. A great many doctors are doing excellent work for fractures with few facilities; but I have had a chance to appreciate how much unnecessary suffering, delay and loss of function results from the treatment of accidents by men who seem to have given little time and thought to the matter. This is both so distressing and so wasteful that for months I have been racking my brains for a remedy; and I have come to the conclusion that it lies in the clinical activities of the members of our association. I am therefore asking very seriously for your help.

Perhaps I can only enable you to realise the sort of thing that is happening by describing in some detail the maltreatment of one particular case.

A HOSPITAL WITHOUT AN ACCIDENT SERWCE

Not very long ago I visited a hospital because the staff had appealed to their Member of Parliament asking him to do what he could to stop the transfer of Service and other fractures from their hospital to the neighbouring orthopædic centre, since they felt perfectly competent to deal with fractures themselves. On my arrival I was introduced to the staff, and then taken to the theatre where a fracture table and two complex reduction mechanisms had been set up. We passed on to the wards. The climax of an unhappy round was reached when we came to the last case, a young soldier who lay moaning and was clearly in great pain. He had been admitted some six days before as a result of accidental bullet wounds which had broken the shaft of his left femur and his left internal malleolus. The history was that after he had been treated for shock his wounds had been excised, and packed, then three or four days later sutured, though his chart showed unabated fever. A long Liston splint was bandaged to his leg and thigh but in no way connected with the pelvis or trunk; indeed the whole upper part projected free in the bed far from the body: the limb below the fracture was twisted inwards and the thigh was lying in a varus curve at the site of the fracture, for the splint had no upper attachment and therefore no control over the fracture either in alignment or rotation: the bandages were soaked with pus and I was told that they were removed for daily dressing of the wound. The man's sufferings were great, needless and futile. It was a situation exciting both pity and anger. Yet at the end of the round the members of the staff seemed unaware of having passed through any unusual experience.

I learned that accidents reaching the hospital were received in turn day by day by the seven members of the surgical staff. The victim of an accident took his luck, good, bad or indifferent. This miserable visit was rounded off by the information that no single member of the staff had been to see fractures well treated at the orthopædic centre 20 miles or so away. I had seen a modern well-equipped hospital of 100 beds or more, staffed by a group of doctors who seemed completely blind to the dire results of their ignorance of fractures, and so complacent that none of them had motored a few miles to see first-class work. Appalling as this example was, it is by no means unique. I know other reputable hospitals in which the same fundamental faults exist. And what is true of the few big fractures is true also of the many little ones, which often require just as much skill and care.

The apathy of many doctors toward fractures has its origin far away and long ago, for, as Hey Groves used often to tell us, from his long experience as an examiner, the teaching of fractures has been badly neglected. Taught little, and by inexperienced residents, if taught at all, many of these young graduates went straight into "private" practice, or to a house-appointment in a non-teaching hospital to work in wards quite secluded from an uninvited consultant. Their treatment now is based on what they picked up in their training 10, 20 or 30 years ago; they are not careless or unfeeling, but just oblivious of a blind spot, and so much in a rut that they do not take the trouble to go and see what a modern accident service is like.

THE DISORDER IS PATENT—WHAT IS THE REMEDY?

Some of us may be inclined to answer this question by saying that accident services are already being developed in many parts of the country, and that the postwar reorganisation of medicine will put these things right. This is all to the good, and students will have the opportunity of seeing experts at work, and of taking part in their activities. For geographical reasons however it is likely to be impracticable to bring all fractures directly under the care of specialists; and, if so, it will be necessary to make some provision in the smaller hospitals. This will cover the treatment of the easier fractures and the primary care of the more difficult. But any organisation will fail if it lacks a due regard for human factors: and two conditions seem essential (1) that the most suitable men available are chosen for the primary care of fractures and fully informed in methods of safety, and (2) that the transfer of the difficult fractures brings them into thoroughly expert hands. The former condition will be well and quickly realised if the doctors in each district grasp the idea, and carry out the selection, picking one or two men from among themselves with good hands and an interest in the power and movement of the body. These men or their colleagues must possess a sound and scientific understanding of shock and resuscitation.

I think that every doctor in the kingdom whose private or hospital work includes the treatment of fractures should know how to splint a fracture effectively and comfortably with a view to easy transport, and in doing so regard three freedoms:—

(1) Freedom from pain.
(2) Freedom from pins (whenever possible).
(3) Freedom of the circulation in the injured part.

Free circulation is, of course, a vital necessity in every case; but the warning signs of Volkmann's ischæmia must be specially recognised, and treated in the light of their implications. Such are the conditions which make for the safety of the part and facilitate the transport of the patient. They can generally be satisfied by simple and straightforward means; a sling or split plaster for the upper limb, for the lower a Thomas splint (skin traction, lamp-wicks and all in the old-fashioned manner) or a split plaster. The understanding of the application of a few simple methods can be acquired by everyone prepared to give up complex gadgets and to learn methods which demand little more than common sense and steady gentle hands.

* Presidential address to the British Orthopædic Association in London on Oct. 29.

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I am convinced that the standard of the treatment of fractures in this country will correspond with the clinical work and the personal influence of the members of this association; for the doctors of the country will seek advice and teaching from men whom they trust and respect, and are always ready to send their patients to a hospital which they know to be first-class. It is for each of us first to spread the knowledge of a safe system of splintage throughout his district, and secondly to set a very high standard in the work of his own hospital, work which is undertaken in clinical alliance with the staff of every department of the general hospital. Indeed he and his whole unit form one member of the diagnostic and therapeutic team of the region.

This should lead to a natural growth of service in accord with the trend, training and interaction of the medical profession. Therefore it should work. And I hope it will be backed, expertly inspected, encouraged, criticised and even disciplined through some regional organisation. I have little doubt that such a development, given financial support and the coöperation of our profession, will be welcomed by the administrators, medical superintendents, and governing bodies of the hospitals.

ORTHOPÆDIC LEARNING

If we orthopædic surgeons insist that the general practitioners and the staff of the reception hospitals shall give primary treatment to fractures on the lines I have suggested, and transfer difficult fractures, particularly those in which the function of the joints may be damaged, it is only right that we should give time and thought to these matters as they concern our own methods in our own hospitals.

Orthopædic surgeons see the seamy side of the life of the locomotor system; we grow familiar with every kind of failure and disaster, our own and those of our neighbours; we see delayed union, non-union, malunion, secondary arthritis, stiff joints, and, worst, of all the end-results of traumatic or early post-traumatic ischæmia. Some of these conditions are so distressing and incurable that it is natural that we should try to trace the cause in each case and consider how the failure could have been avoided. When we do this we find that the great majority of bad results are due to a lack of knowledge, of dexterity, of gentleness, or of sustained interest in the aftercare. But our native job is the restoration of the disabled patient to activity. That is the difficult task on which we sharpen and temper our orthopædic wits, until we become able to perceive what is best for each case and how to achieve it. It is a life-long apprenticeship. As we become familiar with the ways of the living tissues which are the materials of our craft, we understand how to get them to work with us and not at variance. If we want the cells to be active, we supply them with plenty of blood of good quality; if we want bone, we push the matrix; if tendon, we pull it; if resilient fibrocartilage, we move the parts over a wide range without weight-bearing for many weeks. We have been directed toward this knowledge by the insight of Samuel Butler, and by the research and practice of those *Menders of the Maimed* who were immortalised by Sir Arthur Keith in the orthopædic surgeon's bedside book.

If we have set ourselves to understand our craft we owe that wholesome attitude of mind to the tradition set by Robert Jones, Osgood and the other leaders of this association. They have made us mobile and teachable, impressing upon us that we must meet regularly, travel widely, and discuss freely. We meet regularly and so form a society of friends, eager to talk shop and swap ideas; we travel widely to see the work of other men at home and abroad; and we discuss freely in a spirit of mutual understanding and goodwill, seeking the truth without fear of offending one another, showing our failures and confessing our difficulties.

ACTIVE HYPERÆMIA

We know, and we must go on telling others, that the avoidance of constriction in the region of a fracture is not enough. There must be room for the expansion of tissues in which repair is proceeding; the cells of the callus matrix need a plentiful supply of blood from which they can extract what they need, their food, their building materials, and such vitamins and hormones as are essential for their constructive activity. One has only to realise what is happening round a recent fracture to become aware of one reason why there is so much delay in union in these days of skeletal traction.

POWERFUL PERSISTENT TRACTION

There has always been a potentially harmful factor inherent in the method of weight-and-pulley traction; but much actual harm has been done since skeletal traction has made it possible to use heavier weights, and to leave them at work for long periods. H. O. Thomas taught from his practical experience that fixed extension on a Thomas splint was better than weight-and-pulley traction. The regular and rapid healing which Thomas achieved by the classical use of his bed-splint is proof of the virtue of that form of splintage which maintains length but does not maintain traction, and allows scope for the hyperæmia which is part of the natural reaction to trauma. This for him sufficed, for he knew little of the virtue of muscular activity round the fracture which adds a physiological source of hyperæmia; to him rest of the parts was the condition under which healing could proceed without disturbance. He would have been horrified by the powerful, unrelieved, stretch which skeletal traction can impose upon the tissues round a fracture.

Think of it for a moment! The continuity of the bone is broken, skin and muscle are relatively elastic and therefore the stretching force is applied to the infiltrated periosteal and other connective tissues round the fracture, tissues swollen and angry with reaction, alive with young mesoblasts, and amply supplied with blood. This is to become the callus matrix, a proliferative mother tissue, ready to bring forth bone to heal the fracture. The pull of a heavy weight which remains in just as powerful operation after the normal length of the part has been reached, inevitably provokes a reflex protective and persistent spasm of the muscles. Stretched by the weight and starved by the muscular spasm, the tissues round the fracture change from a vascular matrix to barren, white fibrous tissue. It is small wonder fractures thus treated unite very slowly, if at all.

This frustration of healing is in sharp contrast to what happens with a Thomas splint correctly used. The restoration of anatomical length is obtained by almost momentary pulls repeated once or twice a day with plenty of time between for the proliferation of the preosseous tissue. The muscles are comfortably at rest. With the flexion piece of Maurice Pearson (Natal) added, the principle of fixed extension is preserved, and a wide range of movement made available.

That continuous mild traction can give good results has been proved by Pridie, who has gone so far as to say that every fractured femur should be put up in a Russell traction with a 10 lb. weight for the first two or three days and a 5 lb. weight subsequently. But surely the Thomas-Pearson-Balkan frame combination (TPB for short) is much to be preferred, both because the fracture is accurately held in length and line, and because movement of the knee is safe at an early stage through its admirable control. Fixed extension is employed by separate pairs of adhesive strapping; one pair is applied to the thigh and attached to the end of the Thomas, the other to the leg and attached to the end of the Pearson. The whole limb is visible, comfortable, and in turns restful and active; indeed the contraption supplies the patient with a working toy—and after the first few days he is taught to play with it off and on all day, synchronising the action of cord and quadriceps.

FRACTURES INVOLVING JOINTS

Difficult articular fractures fall into two groups: (1) those in which there is difficulty in restoring the shape of the articular surface, and maintaining it without allowing the joint to become stiff; and (2) those in which the difficulties are due to avascular necrosis of a fragment.

Fractures of the articular table of the tibia and fractures involving ankle or subtalar joint are good examples of the first group. In both these the indications following a good reduction are to protect the articular surface from weight-bearing or other distorting force for a long time, and yet to initiate movement soon.

In fractures of the articular table of the tibia I have found the method of reduction described by Kindersley very good, and am sure that this should be tried before

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deciding on open operation. Three factors contribute to reduction, an Esmarch bandage round the head of the tibia, strong traction, and the repeated mild blows of a mallet round the fracture through the bandage. Once reduction in full extension has been achieved, the Thomas-Pearson-Balkan combination is set up, and after four or five days' rest at about 170°, movements are commenced, for the first few days slow and passive, morning and evening, then by the cord and active contraction of the quadriceps. Here we have freedom for muscular, articular and vascular activity; and a treatment in every way preferable to immobilisation in plaster-of-paris and the stubborn stiffness of the knee which follows.

TARSAL FRACTURES

Almost all the tarsal fractures involve joints, and in all after reduction we naturally desire early movement and protection from weight-bearing strains until the danger of secondary deformity is over. There is a simple way I have been using lately to allow the patient to walk with free movement of knee, ankle and subtalar joints.

The leg is in plaster from knee to ankle with the bars of a walking iron spread well clear of the foot, which may be free in a short sock and slipper, or be held in a low plaster shoe with sufficient gap between the two plasters to allow movement of the ankle and subtalar joints. The shin and the head of the tibia need careful padding and moulding and an inverted V is cut over the tendon behind. I have found it impracticable where there is much subcutaneous fat. The patient's weight is transmitted to the leg, and he can be taught to move the ankle naturally as he walks.

The method is very simple and I hope that it will be found helpful in fractures of the os calcis and of other bones of the foot, as well as of the tibia and fibula in the neighbourhood of the ankle-joint. It offers free movement with safety at a very early stage, how early must be decided in each case.

SCAPHOID GRAFTING

McMurray has told us, and I think that many of us go a long way towards agreement, that a scaphoid of the right shape and size, united or not, is a good scaphoid: and that a scaphoid of the wrong shape, united or not, is bad (there are, of course, degrees of badness). Is it not true that late disability in this fracture is confined to cases with limited movement, particularly limited extension? If this is so, is not reduction, if it can be accomplished at this late stage, far more beneficial than bony union, and particularly reduction which will restore full extension?

Are we not beginning to see that the possible indications for grafting are confined to (1) an early case in which after two or three months a series of radiograms has shown that exact reduction, followed by accurate immobilisation, is not achieving union, and (2) a late case with disability after a deformity has been reduced? And how far even these conditions warrant grafting cannot be settled until we know whether union is any better than non-union, and if so, how much; and whether mal-union is better than mal-non-union. These are questions to which our fracture committee might well turn its attention. We cannot expect definite answers to such sweeping questions, but we can hope for a clarification of our conception.

I think that the field for grafting will be confined to a very small proportion of cases, and will exclude those in which there is evidence of secondary arthritis. Furthermore, in defining the field, it is well to remember that the operation, even in practised hands, is neither always successful nor devoid of risk of carpal damage.

It seems likely that most of the cases with a late disability associated with limited movement are due either to non-reduction and a faulty shape, or to non-diagnosis and a lack of rest during the period of reaction. If then we accept McMurray's conclusion, or even regard it as a valuable hypothesis, it seems worth while to remember and practise the method used by Sir Robert Jones of manipulating the wrist into full dorsiflexion and retaining it in plaster for three months, during which period active use of the hand is encouraged. When we do this we should aim at the reduction and close apposition of the parts.

Since an ill-fitting scaphoid commonly causes obstinate pain and disability in manual workers it is very desirable that those responsible for the primary plaster should make sure that reduction is good by radiography, and afterwards take steps to avoid disturbance of the immobilisation during radiography. The young granulation tissue beginning to penetrate the avascular fragment is very delicate, and can be torn by an inadvertent passive movement of the wrist. For this reason removal of the plaster must be accomplished with the utmost care, and the surgeon or sister who has made the plaster ready for removal should go with the patient to the X-ray room and guard the wrist from any movement. This care is necessary at each change until union has been achieved; and those who take these precautions will see few non-unions, and, we can safely prophesy, even fewer cases of subsequent pain and disability.

ATTRACTIVE OPERATIONS—ATTRACTIVE FOR SURGEON OR PATIENT?

As today I am free to give advice, I would recommend great restraint in the performance of the more exacting and therefore attractive operations; and suggest that we should be very critical of new operations, examining their claims closely in the light of biology and physics, and so reach a clear conception of their virtues and indications. Particularly is this so when they carry a risk of doing harm if imperfectly performed, as in scaphoid grafting; and it is even more necessary when they are dangerous to life, as in anterior grafting for spondylolisthesis. None of us nowadays can doubt the soundness of adequately long and strong posterior spinal graft synostosis for spondylolisthesis in those cases where operative fixation is indicated. It is a sound job; the buttress carrying the weight can be made as strong as the surgeon wishes; the operation is straightforward and involves technical procedures which are commonly and frequently performed by orthopædic surgeons. The alternative approach from the front is relatively dangerous; it cannot produce a more effective buttress, and it must be extremely difficult to place a graft or grafts of adequate strength exactly where they are required. In a word the operation is rare, difficult and exacting. Now a very good operator can make a rare difficult and exacting operation easy and safe—almost always! Very well! leave him to it if you know a safer and simpler way. A "surgical exercise" on the cadaver will prove your skill to the examiner; you can help your patient better in humbler ways. The surgeon we want for ourselves and our children is one who will not operate if he can attain his purpose by conservative means, and who prefers a safe and simple operation to one which is attractive to perform, though perhaps a little dangerous.

INTRACAPSULAR FRACTURES OF THE NECK OF THE FEMUR: THE REDUCTION AND THE RESULT

In the past the great majority of these fractures failed to unite; this is still true even of those that are pinned, though here the majority will no doubt be smaller. I am, of course, referring to the total number in which pinning has been carried out; for we know that in skilled hands the majority unite. Imperfect reduction is probably the most common cause of failure, closely followed by subsequent loss of position due to faulty technique in the pinning operation, to faulty placing of the pin or to subsequent difficulties associated with avascular necrosis. It would be very interesting to find out the facts; the fracture committee of the association might well consider an inquiry not confined to work in orthopædic hospitals or other accident services, but on a basis which would take in all hospitals and nursing-homes within the area investigated, in order that the total number of cases pinned, and not a selected group, should furnish the data.

In the meantime we shall not be wrong if we broadcast our conviction that accurate reduction comes first, not only in time but also in importance, because it is the only way of bringing the whole area of the two broken surfaces into contact. I do not, however, advocate the breaking up of an impaction (with a touch of external rotation) provided that it gives an adequate area of contact; indeed the preservation of impaction is often the quickest, surest and most acceptable treatment.

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Smith-Petersen's pin with its exquisite design and the various ingenious gadgets which mechanise its insertion, have tended to put accurate reduction off the centre of the stage, which is its proper place. But once the fractured surfaces have been brought together the aim of Whitman and Smith-Petersen is identical—namely, to maintain this intimate apposition. What Whitman did with plaster can only be copied by the disciples of Smith-Petersen if we make sure that the pin is so placed that it has the strongest possible purchase on the head and is inserted without the least tilting or diastasis of the fragments. The slightest technical error can completely spoil a perfect reduction by a little tilt or separation; therefore no-one should complete the operation without making sure of the exact position of the pin, and the intimate apposition of the fragments, after the last blow of the hammer, by final anteroposterior and lateral radiograms.

There can be no doubt that in subcapital fractures a tibial graft above the pin gives additional security; the value of the graft is enhanced when the creeping substitution in its neighbourhood proves speedier than that round the pin, because the periods of feeble hold of the graft and of the pin do not coincide.

Intracapsular fractures unite only by direct contact; that is my point, the union of an intracapsular fracture depends absolutely upon a reduction which is subsequently undisturbed. Such an achievement makes union certain, though when the head is avascular the contact must be maintained much longer—and that is where plaster fails. On the other hand Kemp, our consulting radiologist, assures me that, from a comparison of X-ray films of cases pinned with those of others treated by conservative means, he suspects the Smith-Petersen pin of being a potent killer of heads; and he tells me that Brailsford shares this view. Their conclusion would, no doubt, be tested if the inquiry I have suggested is undertaken. But the observation might well have been reached by deduction, for the pin as it cuts its way into and through the centre of the head must play havoc with its intrinsic vascular system. Is the pin doing for old heads what Lorenz did for young ones?

I am inclined to think that here again there may be a field for conservative treatment. We know that excellent reduction will often follow a few days on Russell traction or the TPB; and, since it has been our practice hitherto to pin the fracture at this time, we know that the reduction is not easily disturbed by the lifting and moving that are necessary preliminaries to pinning. Does not this suggest that after accurate reduction—the first and absolute necessity in any case—prolonged use of Russell traction, or better of the TPB, would give results comparable with those of the pin? These two methods of splintage exert a pro-anatomical influence which depends mainly on mild traction in the presence of slung flexion of the knee which controls rotation; and their trial would represent a very natural swing of the pendulum, by no means back to the discomforts and the mortality of the Whitman plaster, but to an equally reliable and much more acceptable means of maintaining reduction, with the patient free to sit up in bed, and move his knee. One would insert a pin if signs of avascular necrosis should appear.

THE DEAD HEAD

Avascular necrosis with all its delay and trouble, occurs in a considerable proportion of high fractures which have been pinned, however expert the operation. We have, therefore, to X ray these cases at intervals month after month to ascertain whether the head is alive or dead. If relative hypercalcification appears we know that it is dead and see danger in the offing. This danger begins with the softening of the bone close to the fracture line and spreads until, months later, the cortex can be crushed. The patient is now put into a weight-bearing calliper and warned to avoid any wrench of the hip, such as the sudden lifting of his calliper-laden limb on to a sofa by muscular effort. It may be necessary to explain to the bewildered victim why he finds himself at so late a period hedged round with new warnings and condemned to a calliper for a very long time. For there are five stages through which a dead head must be guarded on its way back to life and strength: invasion by vascular granulations; colonisation; absorption of the old trabeculæ, which were built to carry the weight of the body; replacement of strong bone by primitive spongy bone with spicules that are feeble but cell-controlled and therefore responsive; finally retrabeculation, a response to re-education by graduated function. Dangers beset the head at every stage, concerning first its union and then the integration of its structure. Invasion and recolonisation require good reduction and perfect immobilisation so that the granulations may pass directly and continuously from the living to the dead bone: granulations cannot cross a gap if the dead surface is washed by synovial fluid, for they have no amphibious equipment. Then come the stages of special delicacy and danger when the strong old bone is being replaced by soft new bone which is for a time quite unfit to carry much strain, far less the weight of the body. This period begins some months after the fracture, and lasts for at least another 18 months. It is as if the dead head had to be melted down and recast, but the living process is very, very slow—Phemister rightly named it "creeping substitution."

With such gradual biological processes as I have been describing, and which are necessary to the healing of other injuries, the orthopædic surgeon is at home; for if he is worth his salt he has learnt a due regard for the living reactions of the connective tissues. He knows the conditions they like, the time they need for their various activities, and how their help can be encouraged and directed: he has followed Sir Arthur Keith's advice in cultivating "a close acquaintance with the behaviour of osteoblasts."

THE HOSPITAL AND THE PATIENT

A gentle kindness is the natural response of nurse and surgeon to a patient in distress; it is easy when all he needs is to be tucked up snug and warm in bed and put to sleep, but difficult when treatment demands the unwelcome contact of splint or plaster. The mercy of an orthopædic hospital must be very practical, like that of the Good Samaritan. But it will only be effective if it is based on skill hardly won and generously given by men and women who have taken pains to acquire an intimate knowledge of their work, and are unsparing of time and trouble, day after day, to ensure the exact adjustment of the splintage and the comfort and well-being of the injured part. Loving-kindness put into the effective care of little things graces the work of such a hospital. Then rest comes gently to a broken body and reassurance to a shaken mind.

NAPT SCHOLARSHIPS IN SOCIAL WORK.—The National Association for the Prevention of Tuberculosis is offering two scholarships of £25 each to help suitably qualified women to obtain experience in the social side of tuberculosis work. Candidates will be selected by the association with the advice of the institute of Hospital Almoners, and qualified almoners and students in their last year of training with the institute should apply before Dec. 10 to Dr. Harley Williams, NAPT, Tavistock House North, London, W.C.1.

FURTHER FACILITIES FOR TREATING THE INJURED WORKER.—Since 1941 a large proportion of workers have been eligible for treatment in hospitals or centres of the Emergency Hospital Scheme when they sustain fractures, whether in the course of their employment or not. Since last April they have included manual workers in all factories, and those engaged in building, civil engineering, mining, agriculture, fishing, public utility undertaking, shipping and transport, together with whole-time Civil Defence workers. Circular 2876 of the Ministry of Health states that these workers will henceforth be eligible for the treatment not only of fractures but also of (1) dislocations, sprains, displacement of semilunar cartilages, and other injuries requiring the specialised attention of orthopædic surgeons (including those involving nerves or tendons or severe injury to soft parts); (2) injuries to the head (and their sequelæ) ordinarily treated at head centres in the Emergency Hospital Scheme; and (3) burns severe enough to require inpatient treatment. The extended service is not intended to apply to minor injuries which do not need the advice of a specialist.

A revised list of orthopædic centres, fracture departments and fracture clinics has been issued.

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EFFECT OF ALTITUDE ON CASES OF PNEUMOTHORAX

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With Comments on the Electrocardiograms by

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FOR some time before the war air transport was being increasingly used in civil life; and since the outbreak it has proved valuable for the transport of wounded to the base. Some of these have chest wounds associated with pneumothorax or hæmopneumothorax; and, wounded apart, there are a few pilots in the RAF, thoroughly trained and valuable to the country, in whom artificial pneumothorax has been induced as a treatment for pulmonary tuberculosis. It therefore seemed useful to study the effects of altitude on pneumothorax so as to decide: (1) the optimum height for the transport of wounded with this condition, and (2) the height at which a pilot with an artificial pneumothorax can safely undertake flying duties.

Air transport is comfortable, and air-ambulances are now in use in all the belligerent countries. In order to find both the optimum flying height for chest cases and the necessary adjustments to be made before or during the flight a series of experiments were carried out in the low-pressure chamber on the reactions of cases with pneumothorax to varying altitudes.

Boyle's law states that if the temperature remains constant the volume occupied by a given quantity of gas varies inversely as the absolute pressure exerted on it; or conversely, if the gas cannot expand, the differences of pressure correspondingly increase. In applying this law to the experiments which follow I have had to allow for the mobility of the mediastinum, the presence or absence of pleural adhesions, or the presence or absence of adherent lobes of the lung.

It was well known in the old days that a patient with an artificial pneumothorax ascending to the Swiss sanatoria, situated between 4000 and 6000 feet, became dyspnœic and often needed some air taken off on his arrival; and the converse held when he descended at the end of his sanatorium treatment. I thought it would be a good thing to study, by screening and films, the effects on various types of pneumothoraces.

MATERIAL AND METHOD

A group of 4 cases were selected, 2 right-sided and 2 left-sided pneumothoraces. Case 1, right-sided, was a complete pneumothorax with a mobile mediastinum; case 2 had a partially fixed mediastinum with a large apical adhesion; and of the left-sided cases, case 3 had a mobile mediastinum with an apical adhesion, and case 4 a completely adherent left upper lobe with the mediastinum fixed in its upper part and mobile in its lower third. In both left-sided cases a trace of fluid was present at the base. I chose the same type of case on the two sides in order to see whether vascular changes would be greater on the left than on the right owing to the increased pressure on the heart and great vessels.

Experiments in the pressure chamber were conducted under the following heads:

1. Clinical changes.
2. Radiological changes.
3. Electrocardiographic records.
4. Changes in vital capacity.
5. In the first 2 cases, analysis of the alveolar air at various heights.

EXPERIMENTS

The first experiment on the right-sided pneumothoraces was carried out on May 14, 1942. For convenience I shall write of the changes of pressure as if they were changes of height. Each patient was taken in separately: at the start, while at ground level, the electrocardiographic apparatus was attached, the patient was seated comfortably on a stool, the X-ray equipment was placed in position and the vital capacity machine was to hand. It was decided in the first cases to climb 500 feet a minute and to take tests of the vital capacity, the electrocardiogram and the alveolar air, together with an X-ray screening and photograph, at 2000, 4000, 6000 and 8000 feet and then every 1000 until the maximum height to which we thought it safe to take each patient had been reached.

Table I shows the height, the vital capacity and the alveolar partial pressure of cases 1 and 2 (case 1 with a mobile mediastinum and case 2 with a fixed mediastinum), and fig. 1 compares the alveolar pressure of the two cases with that of a normal subject.

At the various heights mentioned, both on ascending and descending, the patient was screened in expiration and inspiration at 2000, 4000, 6000, 8000 and 9000 feet and was X-rayed in deep inspiration at the same heights.

Clinically, case 1 showed no ill effects until a height of 8000 feet, when he complained of a tight feeling in the chest and a pull on his right apex on breathing. At 9000 feet his pain became acute and thus it was decided to cease the ascent. The screen examination of this case in expiration at 9000 feet showed a great pull of the mediastinum to the left with congestion of the whole of the left lung.

Case 2, with the fixed mediastinum, behaved clinically in a different manner. His symptoms began at 6000 feet when he commenced to feel slight dyspnœa and some pain over the right border of the sternum at the level of the second rib anteriorly. At 8000 feet the dyspnœa was worse and the pain more acute. The great veins in the neck began to be noticeable. At 9000 feet the pain had increased and the congestion of the great veins was considerable. The pulse-rate as shown by the electrocardiogram had increased considerably. The ascent in this case was terminated at this level.

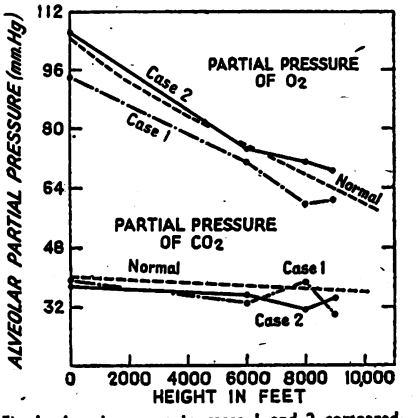

Fig. 1—Anoxia curves in cases 1 and 2 compared with those of a normal subject at various heights.

The screen findings at ground level and at 6000 and 9000 feet in both inspiration and expiration, of cases 1 and 2 are shown in fig. 2, and the radiograms of case 1, taken in full inspiration at the various heights, in fig. 3. The radiograms of case 2 are shown at ground level, 6000, 8000 and 9000 feet (fig. 4).

Screen examination (fig. 2) proved, in this experiment, more significant than the film. It showed not only the striking difference in the amount of collapse between inspiration and expiration, but in case 2 displayed to better advantage than the radiogram the large hernia of the anterior mediastinum which developed, especially at the higher altitudes—for example, at 8000 and 9000 feet.

With cases 3 and 4, the left-sided pneumothoraces, it was decided to ascend at a slightly faster rate in order to ascertain whether rate of climb made any appreciable difference. It was also decided in this experiment, which took place on Aug. 27, 1942, to take the pressures of the pneumothoraces at ground level and at the peak of the ascent, the manometer having previously been adjusted to give comparable pressures at this height and at ground level.

It was decided on this day to take up a 5th case, that of a spontaneous pneumothorax who still had a small bronchopleural fistula present—proved by a previous analysis of the air in his pneumothorax. Table II shows the time taken and the various tests carried out at the various heights. The results of screening are not shown, as they agree with the radiograms taken in both expiration and inspiration. Radiograms at ground level, 6000 feet and the peak of the ascent, both in inspiration and expiration are shown in fig. 5. In case 5 the radiogram at ground level and 6000 feet, during inspiration and expiration, are shown in fig. 6; the screening did not differ from these findings. It will be noted that despite the presence of the small bronchial fistula in case 5 the underlying lung collapsed as the ascent proceeded and at 6000 feet the patient felt pain and was slightly dyspnœic. It was decided to end the ascent at this level.

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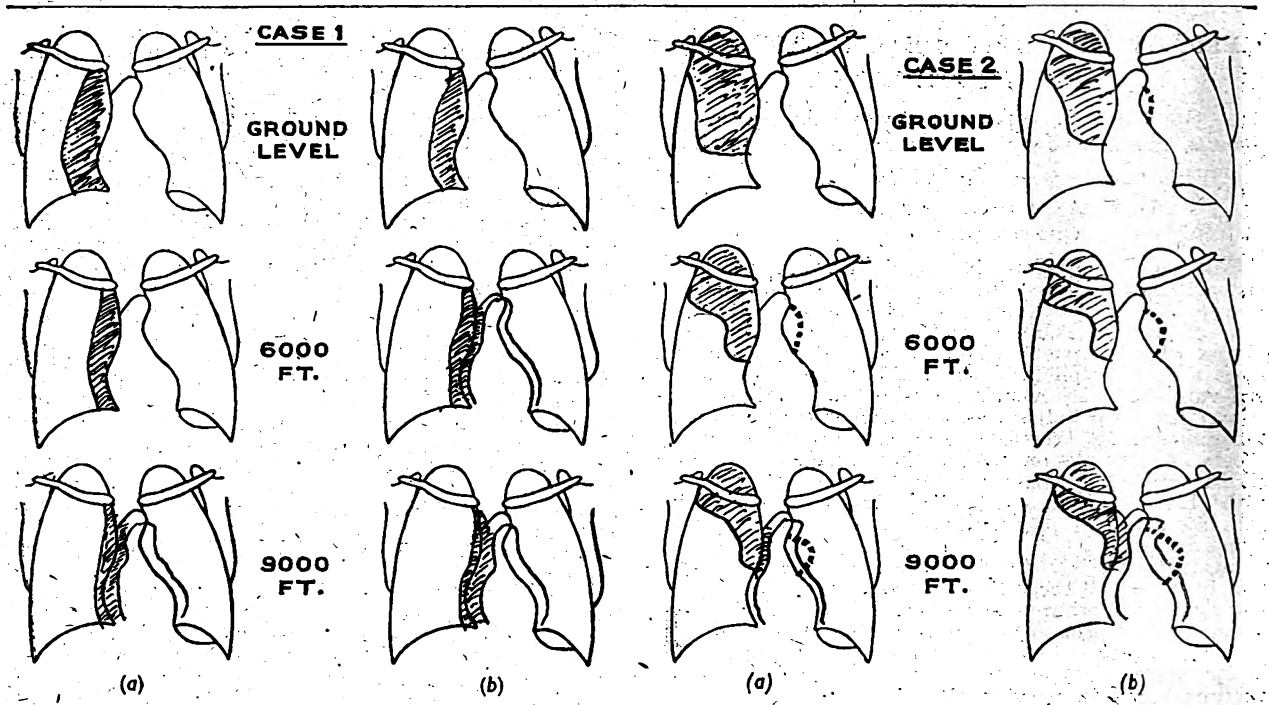

Fig. 2.—*Results of screening* (cases 1 and 2): (*a*) inspiration; (*b*) expiration. Case 1: First pair, ground level; 2nd pair, 6000 ft.; 3rd pair, 9000 ft. Case 2: 4th pair, ground level (anterior mediastinal hernia); 5th pair, 6000 ft.; 6th pair, 9000 ft. (anterior mediastinal hernia much longer).

Electrocardiographic Tracings of the Cases

(WING-COMMANDER ANDERSON)

CASE 1.—No significant change apart from minimal right axis shift. There was increased amplitude of the P waves, due to the increased rate.

CASE 2.—No significant change. Slight right axis shift of 10°, increase in rate with prominence of P and inversion of T3, all attributable to slight torsion of the heart produced by the mechanical effect of increased tension in the left chest in a person with a fixed mediastinum.

CASE 3.—No significant change apart from increased prominence of inverted T waves at altitudes of 7500 feet.

CASE 4.—No significant change, but it is noteworthy that the configuration of the chest lead was absolutely constant and unchanged throughout, although the underlying heart moved a distance of about 2 in. from left to right, the lead

TABLE I—EFFECT OF ALTITUDE ON PNEUMOTHORAX CASES

Case	Height (ft.)	Vital capacity (c.cm.)	Alveolar partial pressure mm. Hg	
			CO_2	O_2
1. R.-sided; mobile mediastinum	Ground	2550	36·9	94·0
	Ascent 500 ft. per minute: 2000	2525	..	..
	4000	2350	..	..
	6000	2200	33·2	71·2
	8000	2050	38·2	59·8
	9000	1600	29·8	60·7*
	Descent 6000	2250	..	..
	4000	2350	..	..
2. R.-sided; apical adhesions, partly fixed mediastinum	Ground	2925	35·6	106
	Ascent 500 ft. per minute: 2000	3000	..	..
	4000	2800	..	..
	6000	2550	34·6	74·7
	8000	2500	31·7	71·1
	9000	ND	34·0	68·7
	Descent 6000	2500	..	..
	4000	2750	..	..

ND = Not done owing to condition of patient. * Doubtful.

TABLE II—EFFECT OF ALTITUDE ON PNEUMOTHORAX CASES 3, 4 AND 5

Case	Height (ft.)	Time of ascent and descent (min.)	Effect
3. L.-sided; mobile mediastinum; trace of fluid	Ground	Zero	Pressure: 0, —5.
	Ascent 2000	4–5	..
	4000	8–11	Pulse 78. Beginning to feel a pull.
	5000	13	..
	6000	15–29	Pulse 78. Resp. 20. Pull still present. Sl. short breath. Pressure: 0, +8.
	6500	30	..
	7000	32–41	..
	7500	42–52	Pulse 80. Some pain in chest. Feeling tight. Pressure: +3, +8.
	Descent 6000	56–59	Pain easier.
	4000	62	Slight pain only.
	Ground	67	..
4. L.-sided; adherent apex, partly fixed mediastinum; trace of fluid	Ground	Zero	Pressure: —4, +2.
	Ascent 2000	2–5	..
	4000	7–11	..
	6000	14–19	..
	7000	21–23	..
	8000	26–32	Feels lump in throat as at refills. Pressure: +10, +15. Tight at base.
	Descent 6000	34	..
	3000	39	..
	Ground	43	..
5. R.-spontaneous pneumothorax with broncho-pleural fistula	Ground	Zero	..
	Ascent 3000	3–6	..
	6000	11–16	..
	Descent ground	26	..

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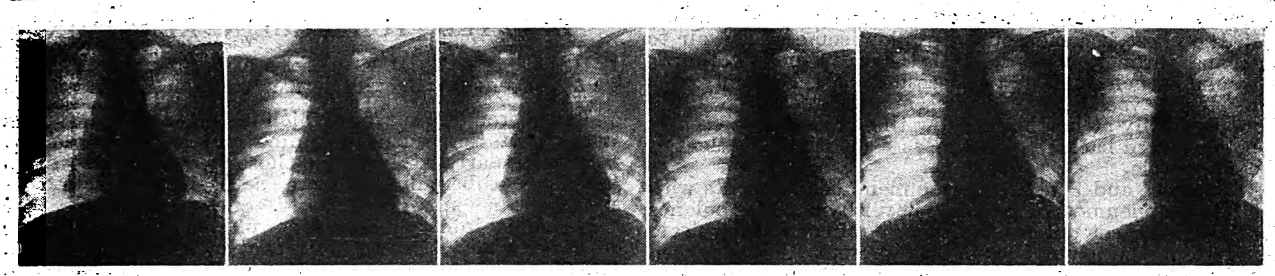


Fig. 3—Radiograms of Case 1 taken at full inspiration at various heights.

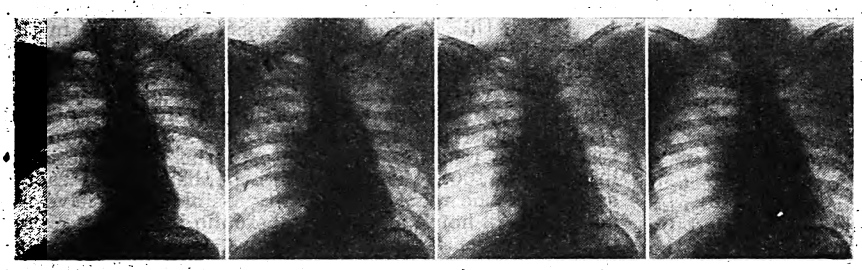


Fig. 4—Radiograms of Case 2 on full inspiration at various heights.

originally lying approximately over the left side of the right ventricle at ground level and about ½ in. beyond apex at 7500 feet.

Though there was appreciable mediastinal movement with increased altitude demonstrable by X rays, the change in the electrical axis was negligible in all cases, the greatest shift being noted in the case where the mediastinum was fixed. This suggests that torsion, rather than lateral movement, is responsible for change of electric axis. The fact that, in 3 of the cases, the T waves were almost iso-electric at ground level, with a tendency to become either biphasic or inverted at altitude, might explain the T wave inversion in all leads at ground level in the remaining case. In this —case 4—neither the clinical findings, the X-ray configuration of the heart nor the remaining complexes of the electrocardiogram provided evidence to suggest the presence of myocardial disease.

Discussion

From this experiment it is possible to draw conclusions about the optimum heights to which a patient with pneumothorax can fly, the necessary precautions to be taken in transporting wounded, and the instructions to be given to a pilot flying with an artificial pneumothorax.

It is dangerous to fly cases of tension-pneumothorax at any height until a needle has been put in position in the chest wall to allow the air under pressure to escape; and it is essential to leave this needle in position during the whole of the flight. It is a well-known rule that cases of open, sucking pneumothorax, due to wounds, should have the wound closed at the earliest possible moment. In these cases, when it is necessary to fly to the base for further treatment, this presents difficulties. No-one doubts the necessity for making an open pneumothorax a closed one as soon as possible, but if a flight is to be undertaken after this and the height of the flight is over 5000 to 6000 feet, it will either be necessary to place an intercostal tube in position before the flight starts, or, if this is not possible, a doctor must accompany

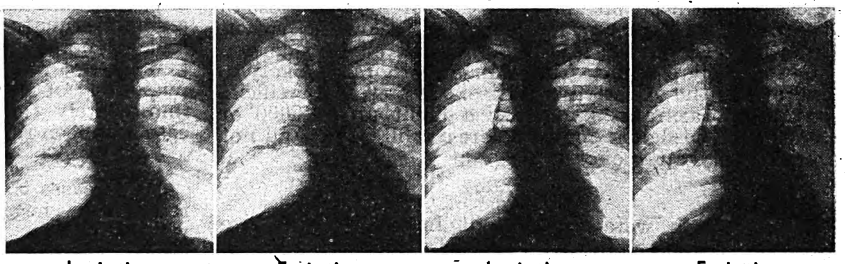
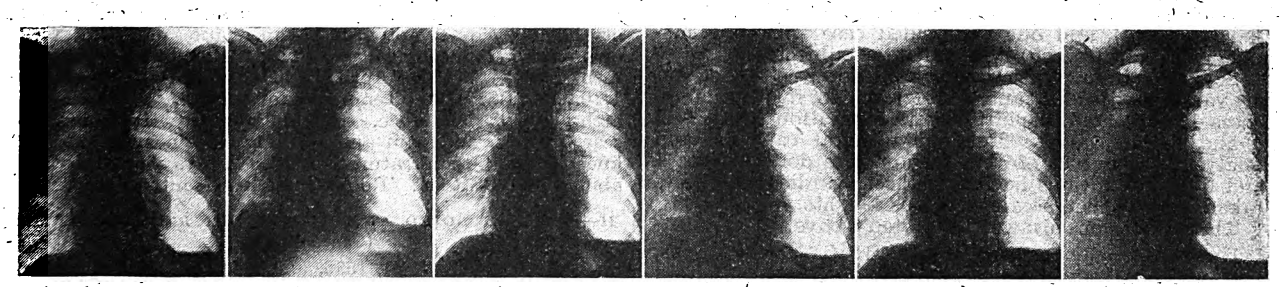


Fig. 6—Radiograms of Case 5 on inspiration and expiration at ground level and at 6000 ft.



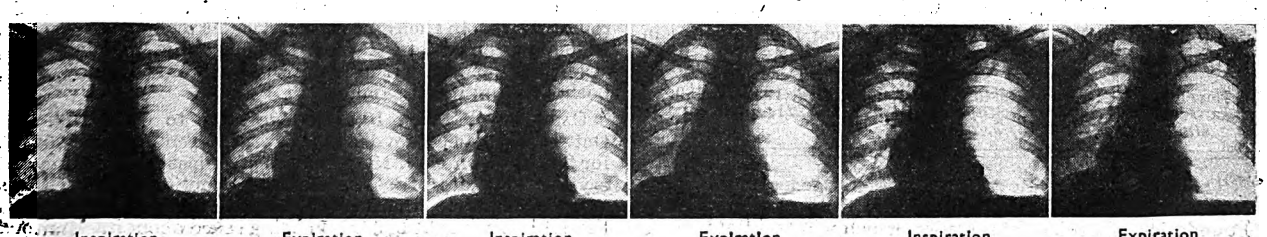


Fig. 5—Radiograms of Case 3 (above) and Case 4 (below) on inspiration and expiration at various heights.

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the case and be ready, should the dyspnœa or pressure in the chest become acute, to allow some of the air to escape through a needle. If the open pneumothorax wound is such a size as to necessitate covering only with a sterile vaseline-gauze dressing, this can be lifted momentarily at height to allow the excess air to escape, being placed back in position as soon as the patient is comfortable.

Lovelace and Hinshaw[1] recommend that patients with a tension pneumothorax should never fly in an ambulance above 3000 feet unless the proper equipment to aspirate air from the pleural cavity is present. It has been pointed out by Lovelace[2] that some patients do not stand aerial transport well if heights in the neighbourhood of 10,000 feet are necessary. Pneumothorax cases may have their pressure increased so much that disastrous effects on the collapsed lung and mediastinum may ensue, and he states that in countries such as the British Isles the disadvantages of aerial transport may outweigh the advantages in cases such as this.

CONCLUSIONS

If possible, no patient with a wound of the chest causing pneumothorax should go above 4000 feet if transported by air to the base. If it is necessary to go to greater heights the pressure should be adjusted by removing as much air as possible before the start of the journey.

In cases of tension-pneumothorax due to escape of air through a lacerated lung it will be necessary to place a needle or an intercostal catheter in position, in order to control the pressures during the flight. Pilots, or passenger personnel, with an artificial pneumothorax, should not fly by aeroplane at the most above 6000 feet for any length of time and should on no account, even for a few minutes, go above 8000 feet.

Those with a mobile mediastinum appear to stand altitude better than those with adhesions or a fixed mediastinum, in whom there is always danger of rupture of an adhesion.

By disregarding the underlying lesion in the lung in a case of artificial pneumothorax and removing most of the air before the ascent it is possible to allow the patient to fly higher; but this is to be deprecated, since expansion of a lung collapsed by artificial pneumothorax is likely to exacerbate the underlying disease. If a case of artificial pneumothorax must undertake a flight up to 8000 or 10,000 feet, he should go just before a refill is due, and not immediately after one.

SUMMARY

Experiments were carried out in the low-pressure chamber to ascertain the effect of height on various types of pneumothorax.

Two right-sided cases, one with mobile (case 1) and the other with partially fixed mediastinum (case 2) and two left-sided cases, one mobile (case 3) and one partially fixed (case 4), and one right-sided case with broncho-pleural fistula (case 5) were taken as subjects.

Screening in inspiration and expiration was carried out at various altitudes, and radiograms in inspiration in cases 1 and 2 and inspiration and expiration in cases 3, 4 and 5 were taken. Readings of vital capacity and analyses of samples of alveolar air were done in case 1 and 2 at the various heights. Electrocardiograms were taken in 4 of the cases at various heights.

The conclusions drawn are stated above.

I wish especially to thank Prof. B. H. C. Matthews, FRS, D SC, and Air-Commodore A. F. Rook, OBE, RAF, consultant in medicine, for their great help and coöperation. My thanks are also due to the medical personnel of the Royal Air Force for their valuable help in making these experiments possible and to Dr. G. M. Little for taking the pressures in the chamber.

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2. Lovelace, W. R. *Proc. Mayo Clin.* 1941, 16, 221, abstracted in *Bull. War Med.* 1942, 2, 238.

The library of the Royal College of Surgeons in Lincoln's Inn Fields has benefited by the gift from the Rockefeller Foundation of a micro-film reader, which will facilitate access to original work done abroad and at present difficult to come by in this country.

DELAYED TUBERCULIN REACTION

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IN tuberculosis surveys which include tuberculin tests as part of the routine examination, it is common to retest regularly at least all those persons who fail to react to tuberculin. Where a positive reaction is recorded at subsequent tests, one can assume that tuberculous infection has taken place between the date of the last negative test and that of the first positive. This interval is usually 6 or 12 months or more, and the presumed date of infection can then only be a rough approximation. Thus tuberculous infection is rarely diagnosed by tuberculin tests at the time of occurrence. In view of this, the following observations made in the course of the Prophit tuberculosis survey appear to be of particular interest.

A number of persons who failed to react to either of the initial injections of tuberculin (0·1 c.cm. of OT 1/10,000 and 1/100) have, several weeks after the initial test, had a reaction at the site of the last tuberculin injection (1/100). The reaction is of the same character as that of the reaction normally visible in positive reactors 48–72 hours after the tuberculin injection. Moreover, it leaves a mark which may persist for several months, in the same way as a strong Mantoux reaction.

The reaction is not of the same type as the "torpid" reaction described by Pirquet (1909). The torpid reaction appears a few days later than the reaction normally observed, and was believed by Pirquet to indicate the existence of an old tuberculous lesion in the process of healing. Reactions of this type also have been seen in the survey.

Many of the delayed reactions pass unnoticed. During the past year, since this possibility was kept in mind, characteristic marks have been observed at the site of previous injections of OT 1/100 in people presenting themselves for retest 6 months or more after previous negative test; 5 of these, on being questioned, stated that they had noticed the reaction, and were able to give an approximate date of first appearance. The others had not noticed it. As routine procedure, therefore, all persons not reacting to tuberculin are now told of this possibility of delayed reaction, and are asked to report immediately they note any such reaction. One such case has been reported.

CASE-HISTORIES

In 14 cases the last Mantoux test before the delayed reaction was negative, and the test following the reaction was positive.

I—REPORTED AT THE TIME OF REACTION

CASE 1.—On Sept. 2, 1942, and Feb. 22, 1943, negative to OT 1/100. On April 1, 1943, 5 weeks after the last test, reaction at site of last injection: 10 mm. œdema, 20 mm. erythema. No symptoms. Temperature normal. X-ray examination: nothing abnormal. Blood sedimentation rate (BSR) 19. On April 15, Mantoux test: 2-plus to 1/10,000. BSR 23. Temperature normal. Warded with arthralgia of right knee. Inflammatory reaction round old scar of knee, and pain and swelling of joint. On May 11 knee normal; temperature normal. X rays showed nothing abnormal. BSR 34. Refused further Mantoux test.

II—REACTION NOTED AT THE TIME BUT REPORTED LATER (Cases 2–7)

CASE 2.—On Nov. 24, 1936, and Dec. 7, 1937, negative to OT 1/100. January, 1938, about 4 weeks after last test, œdema and erythema at site of last injection. Had a cold at the same time, with substernal pain. X rays showed round shadow in the right infraclavicular region. On June 2, 1938, Mantoux test: 2-plus 1/10,000. In January, 1939, suspicious shadow, left infraclavicular region. In May, 1939, both shadows much smaller.

CASE 3.—On Aug. 10, 1942, negative to OT 1/100. On Oct. 15, headache; feverish for a week. Temperature 102° F. for 2 days. On Nov. 15, 3 months after last test, œdema and erythema at site of last injection. Reaction lasted 7 days. On Feb. 20, 1943, the mark of the reaction still visible, and the subject gave the history on being asked about it. Mantoux test: one-plus 1/1,000,000. X rays showed round focus, right mid-zone.

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CASE 6.—On Aug. 10, 1942, negative to OT 1/100. In May, 1943, œdema and erythema at the site of last injection. On June 5 X rays showed enlarged root glands. On June 28 the mark of the May reaction was still visible. Mantoux one-plus 1/10,000. Patient complaining of cough. On July 16 X rays showed that the hilar glands were larger; there was a lesion at the left apex.

III—REACTION NOT NOTED AT THE TIME (cases 8–14)

Here, in people presenting themselves for retest, a characteristic mark was noted at the site of previous injection, the initial result of which had been negative. The reaction had passed unnoticed.

The main features of these cases are shown in the table.

Case	Interval between last neg. and: Delayed reaction	Interval between last neg. and: First positive	First positive reaction: dilution	Symptoms before or at time of delayed reaction	X-ray findings *
	wk.	wk.			
1	5	32	++ 10,000	Nil	Nil
2	4	26	++ 10,000	Coryza, substernal pain	Round focus (6)
3	13	28	+ 1,000,000	Pyrexia	Round focus (28)
4	16	28	+ 10,000	"Gastric 'flu"	Nil
5	2	28	++ 10,000	Jaundice	Nil
6	39 (about)	43	+ 10,000	Cough	Enlarged hilar glands; focus lt. apex (46)
7	43 (about)	57	+ 100,000	Nil	Nil
8	?	39	+ 100,000	Cough, sputum, pyrexia	Diffuse shadow rt. base (19)
9	?	26	+ 100,000	Nil	Nil
10	?	28	+ 1,000,000	Nil	Nil
11	?	30	+++ 100	Nil	Nil
12	?	24	+ 1,000,000	Laryngitis, pyrexia	Nil
13	?	47	+++ 100,000	Cough	Nil
14	?	26	+++ 100,000	Nil	Nil

* The figures in parentheses show time, in weeks, since last negative test.

In one case observed a delayed reaction occurred in a person originally reacting only to OT 1/100.

CASE 15.—On Sept. 4, 1942, positive to OT 1/100 (i.e., negative to 1/10,000). In January, 1943, contact with tuberculous patients. A week later, erythema and œdema at site of last tuberculin injection. Feb. 22, 1943, Mantoux 2-plus 1/10,000.

All the above cases except one were nurses; case 2 was a medical student. Opportunities for observing this phenomenon have been greatest in the group of nurses, which is however only one of 5 groups included in the survey. Entrants to the survey have a tuberculin test and a chest radiogram once a year for 5 years; where the initial reaction is negative, the test is repeated 6-monthly till positive.

DISCUSSION

Delayed reaction after negative test (cases 1–14).—In all cases but one the test after the "delayed reaction" was positive to small doses of tuberculin (0·1 c.cm. of 1/10,000 or less). In 3 cases a primary focus was observed shortly after the delayed reaction, and in one case a diffuse shadow which may correspond to perifocal infiltration. Out of 7 subjects who observed the delayed reaction, 5 had other symptoms. In case 3, four weeks before the reaction, there were symptoms which may have corresponded to the primary infection. If this is so, the case is particularly interesting, showing the time lag between the infection and the development of allergy.

It is assumed that the delayed reaction observed in the cases reported occurs shortly after an infection, and the reaction to tuberculin still present in the skin occurs at the time tuberculo-sensitivity reaches a definite level. If this occurs often we have a number of possibilities of investigation into the circumstances of primary infection and the reactions of the individual at the time. Primary infection is usually not accompanied by symptoms of any note, and is therefore rarely detected at the time. The delayed reaction described marks the date of infection, or at least of development of sensitivity following infection.

A question arises here: can one say that in these cases tuberculin was retained in the tissues in the absence of previous infection? Or had the infection occurred before the last tuberculin injection, and had allergy developed to a degree high enough for the antigen-fraction of the tuberculin to be fixed intracellularly, but not yet high enough to produce the typical reaction? In the second eventuality, the skin reaction would develop later when tuberculo-sensitivity had reached a high enough level. In cases 3, 4, 6 and 7, however, this appears improbable since in these cases the interval between the last negative test and the delayed reaction is between 3 and 10 months. That a substance like tuberculin can be retained in the skin for a long time is borne out by an observation by Prof. G. S. Wilson (1943):

> A person who failed to react to an intradermal brucellin test, and who contracted undulant fever 2 years later, developed, at the time of the illness, a reaction at the site of the previous brucellin test.

Considering the number of tuberculin surveys carried out in America and Scandinavia, it is curious that cases of delayed reaction have been recorded so rarely. The only published cases found were as follows:

Ianne (1939) wrote: "A student nurse had no reaction to three dilutions of OT until 6 weeks after the tests were done, when definite one- and two-plus reactions showed at the sites of injection. Evidently infection had occurred in the meantime and caused a reaction to unabsorbed tuberculin. A subsequent tuberculin test substantiated the fact that infection had occurred. . . . This bizarre reaction was discussed with Doctor Long and most of the pathologists present, without securing an answer."

Malmros and Hedvall (1938) mention one case in which a reaction was observed two weeks after a negative test, and another case one week delayed. The latter may have been a torpid reaction. Hart, Hilton and Morland (1940) have reported a case which was the first one observed in the Prophit survey, and is reported above (case 2).

Any reason advanced for the relative frequency of the observations in the Prophit survey compared with other surveys must be purely speculative. First, it will be noted that all except case 2 were seen in 1942 or 1943—that is, since a point has been made of looking out for such cases. During the preceding 7 years of the survey, in the absence of special observation, only 1 case had been noted. It is possible then that in other surveys such cases do occur but pass unobserved. Another possibility is that certain tuberculins may be more slowly absorbed than others, and that the tuberculin used in the survey is of such a character.[1] If this is true a wide field of investigation is possible along the lines of preparing a tuberculin which after intradermal injection will remain in situ for a long time, and serve in initial negative reactors as an indicator of subsequent infection.

Wassen (1936, 1938) has recorded experimental work along these lines. A mixture of tuberculin and liquid paraffin was injected into the skin of two previously tuberculin-negative subjects. One subject had a reaction at the site of injection 2½ months later; a Mantoux test then was strongly positive, and the chest X-ray film showed a large shadow in the left hilum. Another subject reacted at the site of injection 6 months later, and the reaction slowly increased in size during the following year.

Delayed reaction after positive test (case 15).—The facts here are not in contradiction to what is known of tuberculo-allergy. It is known that in the presence of massive or repeated contact tuberculin sensitivity can rise from a low degree to a very high one. It has also been shown experimentally that in previously infected animals (Willis 1928) and persons (Saenz and Canetti 1939) whose sensitivity has been reduced to zero or a very low degree,

1. The sample of tuberculin used was prepared on synthetic medium (Douglas and Hartley) and its potency was equal to international standard. It contains approximately 50% of glycerol.

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sensitivity rises after superinfection much more rapidly than after their primary infection. It is therefore not surprising that in case 15 the reaction appeared as early as a week after fresh contact.

Observations of analogous character were made in early experimental work of Klingmüller and Slatinéano quoted by Bordet (1919). When, some time after a previous tuberculin test, tuberculin is introduced into the circulation, the site of local cutaneous or conjunctival reaction frequently shows a new inflammatory process. The "flare-up" ("anflammung") may also be produced by intracutaneous injection of tuberculin in the vicinity of the site of a previous tuberculin test. A similar phenomenon is the flare-up at the site of previous tuberculin tests in the course of tuberculin treatment.

SUMMARY

Delayed tuberculin reactions in 15 cases are reported. In 14 of these, the reaction developed between 2 weeks and 10 months after previous negative test.

The date of the infection responsible for the reaction may have been previous to the date of the last negative test; but it is more probable that in many of the cases infection had occurred since the last negative test and caused a reaction to tuberculin persisting in the skin.

If the second interpretation is correct, the reaction serves as a valuable indicator of "primary infection."

I am indebted to the Prophit Committee of the Royal College of Physicians for permission to publish this paper, and am particularly grateful to Prof. G. S. Wilson, Dr. P. D'Arcy Hart, and Mr. Percival Hartley, D SC, FRS, for helpful advice and criticism.

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EFFECTS OF ACCIDENTAL EXPOSURE TO MUSTARD-GAS VAPOUR

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As a result of an accident a number of soldiers were recently exposed to an unknown dose of mustard-gas vapour in their sleeping-quarters. Exposure was for a period of half an hour or less about midday, and continuous from about 6 PM. In addition three men were exposed for a time in the forenoon. One of these, at 7 PM, complained of stinging eyes, a blocked discharging nose, and temporal headache, which prevented him from going to sleep. Three others noticed smarting eyes, dryness of the throat, or slight cough about 9 PM. Most of the rest went to sleep.

Between 11 PM and midnight—that is after 5–6 hours' continuous exposure—many men wakened with symptoms; gas was suspected, and all were ordered downstairs. They complained of painful watering eyes, with photophobia and dimness of vision; some could not open their eyes. They had moderate to severe headaches, mostly frontal, which lasted several hours or longer. They vomited, often repeatedly for an hour or two, and they were dizzy. Their throats felt dry, or in a few cases slightly sore, and some of them felt constriction in their chests; they coughed, but only to a slight extent.

The men were given temporary accommodation for the night. In the early morning castor oil drops were placed in their eyes. Later they were stripped, washed, and transported to hospitals. The observations here reported concern 12 of them admitted to one hospital. Another 13 milder cases were treated at another hospital.

SIGNS, SYMPTOMS AND CLINICAL COURSE

On admission about midday the men were tired and apathetic but not shocked. Their pulses were rather full and bounding, and their systolic blood-pressures slightly raised (116–142 mm. Hg), for the first day or two. Fever developed in half of them, with temperatures of 99°–100·6° F., not lasting longer than 3 days.

Skin.—Bright red erythema was present on faces and necks, the parts unprotected by clothing, sleeping-bags, or hair. In 3 cases it became more intense on the second day. However red, the skin was not itchy and not tender to pressure. Only in 1 case did vesicles appear—five tiny ones near one inner canthus. From the first or the second day the erythema quickly faded, disappearing in three to six days, leaving neither discoloration nor desquamation.

In 3 men fresh areas of erythema appeared on the fifth, sixth or seventh days in other places—the hands, the forearms, the antecubital fossæ, the axillæ, or the back of the upper chest. These areas were only moderately red; they itched or burned slightly, and in two days turned brownish, then faded, with slight desquamation.

Mouth, throat, larynx, trachea and bronchi.—On admission the men complained of dryness of mouth and throat, and in every case the soft palate, fauces and tonsils were intensely red and slightly swollen. These symptoms and signs subsided on the second and third days, but suddenly on the evening of the sixth day 10 of the 12 men developed burning pain in their throats, and distinct hoarseness, amounting in 2 cases to aphonia. These symptoms lasted, with diminishing intensity for, three to five days.

At the same time there was a little accentuation of the cough which was present in all the men from the time of admission and lasted into the second week. This cough was mostly nocturnal, and never severe, producing only scanty mucoid or mucopurulent sputum. Occasional rhonchi indicated minimal involvement of the bronchial tree in a few cases, but no other pulmonary signs developed, and radiological examination of the lungs in 4 of the severer cases on the second and the fourth days showed no abnormality.

Eyes.—On admission discomfort in the eyes varied from smarting or aching to severe pain. The lids were œdematous and red, and in some cases the men were unable to open them, on account of swelling but not of blepharospasm. Those who could open their eyes had photophobia and dimness of vision. The conjunctivæ were injected and the flow of tears profuse.

On the second day discomfort and lid-swelling were less, but chemosis was noted in 2 cases, one of which also showed triangular whitish conjunctival opacities on either side of each cornea. In 4 cases there were milky transverse bands on the corneæ, visible to the naked eye, lying opposite the interpalpebral fissures; most of the rest showed faint corneal haziness.

On the third day the characteristic opaque white triangles had appeared in the conjunctivæ of another case, but in general the signs in lids and conjunctivæ were subsiding, the corneæ remaining unchanged. This improvement continued, but was interrupted on the seventh day by a transient exacerbation of ocular discomfort (stinging, smarting, or watering) in 5 of the more severely affected cases. In all but 2 cases the eyes had returned to normal in 2 to 4 weeks. None developed purulent conjunctival discharge at any stage.

Examination of the cornea with a loupe (by Prof. W. J. B. Riddell) on the fifth day showed some superficial corneal œdema in 9 cases, with slight staining by fluorescein in 2.

Treatment.—On admission 3 drops of 2½% sulphacetamide ('Albucid') solution was placed in every conjunctival sac. This was repeated 2 and 4 hours later. It gave appreciable symptomatic relief. Thereafter for 4 days 2½% sulphacetamide ointment was applied between the lids twice daily and for 10 days the pupils were kept dilated with atropine. During the first 2 days swollen eyelids in close apposition were gently separated by a nurse every hour or two to facilitate the escape of tears. Sulphadiazine was given for 4 days to the cases showing rises of temperature, and sedatives administered for nocturnal cough.

All of the men, with the possible exception of 2, could have been regarded under active service conditions as fit for duty by the tenth day.

COMMENT AND SUMMARY

These cases were examples of mustard-gas injury due to prolonged exposure (6 to 8 hours) to a low concentration

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of the vapour. They conform in general to the standard descriptions and were of slight to moderate severity. Among the clinical features, the following are worthy of note:—

1. Vomiting immediately and for some hours after exposure was repeated and severe, although cough was slight. It may be attributable to swallowed mustard vapour.

2. In the milder cases the initial erythema of skin and fauces, the pain in the eyes, the eyelid swelling and the conjunctival injection were maximal within 24 hours of exposure and thereafter declined. In the severer cases the skin erythema and the conjunctival changes (including chemosis and opaque white triangles) increased to a maximum on the second or the third days, and then declined.

3. Certain delayed effects appeared between the fifth and the seventh days—viz., erythema on areas of skin not previously reddened, sore throat and hoarseness or aphonia, and accentuation of cough and of smarting or watering of the eyes.

4. No secondary infection developed in conjunctivæ or lungs.

RETROGRADE AMNESIA

SOME EXPERIMENTS

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THE duration of amnesia *after* head injury has acquired practical importance as an index of the severity of the cerebral trauma (Symonds 1928), but retrograde amnesia (i.e., loss of memory for events preceding the accident) also remains an important clinical signpost. To the physician who finds the patient conscious, it is the first indication that the brain has been organically affected. Theoretically, too, there is interest in the paradoxical disappearance of material perceived at a time when the patient's faculties of observation and retention were still intact. It has long been known that retrograde amnesia follows not only trauma but many other forms of organic interference with cerebral function, such as suicidal attempts by hanging or gassing, and epileptic fits.

The general use of epileptiform convulsions for therapeutic purposes in psychoses provides a welcome opportunity of studying the phenomenon, making it possible to observe the psychological after-effects of an artificially produced cerebral disturbance, repeated several times in the same subject, and therefore to approach experimentally a problem which cannot be studied in animals.

Experiments of the kind to be described have been possible only since Meduna's original method of inducing the fit with an analeptic drug has been replaced by applying a short electric stimulus (Cerletti and Bini 1938). The preconvulsive period of anxiety and terror has thus been abolished, and objection and resistance of the patient to the treatment have become rare. All he remembers is that he has been put to sleep. Immediately after the convulsion he is confused and clouded for about half an hour and sometimes restless. This stage is followed in most cases by a short deep sleep. The further sequelæ vary a great deal. Some patients remain slightly drowsy and tired for as long as half a day, some only complain of headache; others are apparently well and resume their usual activities. Similarly the post-convulsive amnesia varies considerably.

METHOD AND SUBJECTS

Among the psychotic patients treated some selection was necessary in order to avoid those whose underlying psychosis might have interfered with the results of the memory test. All patients with impaired memory retention due to the underlying illness or to previous convulsion treatment were excluded, and all those whose full coöperation was doubtful. Most of those selected were depressives at a stage of beginning recovery, the rest schizophrenics and paraphrenics without acute symptoms interfering with retention.

Testing was restricted to the last minute before the electric current was applied. Four pictures of postcard size, coloured or black and white, easily recognisable and describable, were shown to the patient after all preparations for the treatment were completed, the patient lying on the couch with his headband fixed. Each picture was displayed for 15 seconds while the patient was told he should try to remember them. After 24 hours or less, but always in a condition of apparent recovery from the direct effects of the treatment, the subject was asked if he remembered any pictures and what they were. This test of "recall" was followed by a "recognition" test: he was asked to select the pictures he recognised from a series of 8–12 pictures among which the original ones were mixed. After some preliminary trials this standard procedure was found preferable to the display of a variety of visual and auditory material as used by Flescher (1941); moreover he extended the duration of testing to 5 minutes before the fit, which makes his results hardly comparable with those of the present study.

The simplicity of our test made remembering so easy that if an amnesia was found, its existence seemed beyond doubt; and on the other hand the time allowed before the convulsion was so short that we could count on detecting even the briefest retrograde amnesia. On the whole the patients liked looking at the pleasing pictures which distracted their attention from the alarming atmosphere of medical appliances and surrounding nurses.

RESULTS

Findings are based on 102 tests carried out in 46 patients. Recall of all 4 pictures was found complete only in 4 experiments performed by 2 patients. All others had forgotten some or all pictures when asked to recall them. Recognition was complete in 29 out of 102 tests which shows that retrograde amnesia is not a universal symptom after epileptiform convulsions. In a high proportion, however, some of the memorised material had been forgotten. If this indicates retrograde amnesia, more of the pictures shown first should be remembered than of those shown last. If the amnesia is patchy or uniform the first and the last shown pictures should be recalled or recognised in an equal number of experiments.

TABLE I—ANALYSIS OF PICTURES RECALLED AND RECOGNISED IN 102 TESTS OF 46 PATIENTS

Numbers	Picture 1	2	3	4
Recalled	43	41	30	22
Recognised	73	74	66	57

The figures of recollected pictures, as given in table I, show a progressive decline towards the last picture both for recall and recognition. The difference between the number of remembered first pictures and that of remembered last ones is 21 for recall; this is four times the standard error of simple sampling which is 5. The difference in recognition is 16—3·5 times the standard error (4·6). The differences are therefore statistically significant; the amnesia is of the retrograde type. It may be added than when I asked the patients who recognised the whole series (29 experiments) to reproduce the order in which the pictures were given, it was regularly the third and fourth pictures about which they were uncertain or mistaken.

Another result illustrated in table I is the greater number of pictures recognised than of pictures recalled. On the average, in the recognition test the amount of remembered material was double that in the recall test.

TABLE II—ANALYSIS OF PICTURES REMEMBERED IN 43 TESTS AFTER 3–8 HOURS AND IN 59 TESTS AFTER 24 HOURS

Numbers		Picture 1	2	3	4
Recalled	after 3–8 hrs.	23 (53)	20 (46)	12 (28)	8 (18)
	after 24 hrs.	20 (34)	21 (35)	18 (30)	14 (24)
Recognised	after 3–8 hrs.	37 (86)	37 (86)	32 (74)	25 (58)
	after 24 hrs.	36 (61)	37 (63)	34 (57)	32 (54)

The figures in parentheses are percentages.

To assess the influence of the time of testing on the extent of retrograde amnesia the experiments were divided into two groups. Of 102 tests, 43 were carried out 3–8 hours after the fit, and 59 after 24 hours had

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elapsed (table II). If one takes the difference between the first and last picture as a measurement, retrograde amnesia certainly seems much commoner if tested for earlier; recollection seems 3 to 5 times better after 3–8 hours than after 24 hours. On closer scrutiny, however, one realises that this difference is to a large extent due to better recollection of the first picture after a shorter interval and that the difference between the number of remembered last pictures is insignificant. All one can say from our experiments is that the first pictures are definitely better remembered a few hours after the fit than after 24 hours and that the last picture does not share this advantage. However this may be interpreted, the figures show that it is not a matter of indifference at which time the patient is tested for retrograde amnesia.

DISCUSSION

From the results of these experiments the existence of retrograde amnesia as a primary symptom after epileptiform convulsions seems established. The fact that it was present in circumstances incomparably more favourable to remembering than those of an accident leading to a head injury removes a number of theories of retrograde amnesia from discussion. Thus the theory that the events preceding many accidents are forgotten because of their routine and casual character, can be discarded since retrograde amnesia was found for memorised material. Then the length of the memory gap *following* the accident cannot be held responsible; this gap never lasted more than a few hours in our experiments. The idea that circumstances of an accident are suppressed from memory because of their unpleasantness, or because of guilt feelings, the symptom being explained as secondary to emotional factors, is not supported by our findings. Even if some of the displayed pictures were remembered or forgotten because of likes or dislikes of the patients, such predilections would have been balanced in so large a series of subjects and of experiments. Special care was taken to change the pictures often and to vary the order of display.

The current view prevailing among neurologists and psychiatrists is that the cerebral injury destroys the traces or "engrams" of the immediately preceding impressions. Apart from the difficulty of accounting for a selective blotting-out by a disturbance affecting the whole of the cerebral cortex, the difference found between the tests of recall and recognition in our experiments is strongly against such a theory. The recall test closely resembles the questioning of the patient by the examining physician after an accident. Its results, as the figures show, could be greatly improved on in the recognition test. Similarly, Klein and Kral (1933–34) were able to reduce the retrograde amnesia after accident in one of their patients by reconstructing the situation before the accident. Such improvement would be impossible were the traces destroyed by the cerebral injury.

In other words, the apparently lost memory material obeys the normal rules of reproduction according to which recognition is always easier to recall. To arrive at a more satisfactory theory it seems appropriate to make use of a principle of normal psychology dealing with a similar phenomenon in memorising and learning—that of "retro-active inhibition" (Mueller and Pilzecker 1900). This depends on the well-known rule tested in numerous experimental studies that memorised material is better remembered if the learning of it is followed by an idle interval; and that mental or physical effort immediately after learning disturbs its recollection. In spite of its name (which has often been criticised) there is nothing to prove that retro-active inhibition acts backwards. One of the most favoured explanations of the principle is that learning is followed by a period of gradually diminishing activity of neural processes which intensify the associations established in the learning. If this "after-discharge" of neural elements consolidating the memory pattern (Britt) is interfered with by an interpolated activity, the memorised material is not so well remembered. The application of this well-established mechanism and of its explanation to retrograde amnesia is obvious: the cerebral injury prevents the latest memory traces, which are still in the process of consolidation, from being properly formed and organised. Thus retrograde amnesia can be regarded as an extreme case of retro-active inhibition.

As an explanation of retrograde amnesia the idea is not new. In 1875 Hamilton interpreted it as follows: "In order that a recollection may organise and fix itself, a certain time is necessary which in consequence of the cerebral excitement does not suffice" (Hack Duke 1892). That the theory corresponds to teachings of modern psychology should make it more acceptable.

It seems, however, difficult to suppose that consolidation of memories should be a process lasting over days or weeks, and therefore, according to this theory, retrograde amnesia should be short. In fact, its brevity in our experiments is striking. In only 10 instances out of 102 did it extend over one minute. Investigators of large numbers of patients with head injuries have pointed out that retrograde amnesia for days or weeks is extremely rare. Russell (1932) found a duration of more than 24 hours in only 4 out of 180 cases, and in most of his patients it lasted a few seconds or minutes only; among another series of 500 head injuries he found only one with a permanent retrograde amnesia extending backwards over one week.

The qualification "permanent" turns on the observation that retrograde amnesia after cerebral injury often shrinks with the time elapsing after the accident. Comparison of test results after 3–8 hours with those after 24 hours (table II) is suggestive of a shrinkage, but does not clearly prove it. Perhaps 24 hours is still too early for testing the "permanent" retrograde amnesia and a later test would have revealed a diminishing amnesia. It may be that retrograde amnesia after induced convulsions is generally too short to give clearer insight into this point. On the other hand, the difference in the results of the two groups of tests, especially in remembering the first picture, shows that retrograde amnesia is undergoing some change during the first day after the trauma; this change is probably not one of the memorised material, but of the ability to reproduce it. Cerebral efficiency in general is definitely impaired immediately after the convulsion, as is shown by confusion and cloudiness lasting an hour or more. It seems not to be completely restored at a time when clinically the patient is apparently recovered.

In patients with head injuries there is a parallel to the fuller recollection of the first picture in the early tests: patients occasionally reproduce, in post-traumatic drowsiness, details of the accident which they have forgotten when they regain consciousness. This event, illustrated in Russell's cases, can have medicolegal consequences; and it defies all theoretical explanations.

Among the questions left unanswered by the present investigation is that of the individual differences between our subjects' retrograde amnesia. Many were tested several times, each seemed to keep to his own type of remembering or forgetting the picture series. As mentioned before 2 had remembered everything and in 6 patients (10 experiments) the amnesia was longer than one minute. Others recalled little, but recognised all pictures; in others, again, recall and recognition were rather similar in distribution; and so on. Individual differences in patients with head injuries are easily explained by the different severity of the cerebral damage and by its localisation. The electrically induced epileptic seizure, however, seems to vary so little in its clinical symptoms and in its duration from case to case, that one is forced to surmise an unknown personal factor influencing the extent of retrograde amnesia—a factor which may play its part in post-contusional cases as well.

SUMMARY

In patients experiencing electrically induced convulsions retrograde amnesia was found for material memorised during the last minute before the fit.

Patients more often showed retrograde amnesia for the recall of material than for its recognition.

In only one-tenth of the experiments was retrograde amnesia longer than one minute.

The time-interval between fit and test influenced the results of testing. Shrinking of retrograde amnesia, though suggested by the difference in findings, could not be plainly demonstrated.

In contrast to the idea that retrograde amnesia is caused by the destruction of memory traces, the theory

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is proposed that the cerebral injury interrupts the consolidation of recent memories. This is analogous to the phenomenon of retro-active inhibition in normal psychology.

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RESECTION OF SMALL INTESTINE IN AN INFANT THREE WEEKS OLD

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INGUINAL hernia is common in small children, and in 5–7% of cases is irreducible (Hogg 1942). Strangulation, however, is unusual: of 1740 cases of inguinal hernia recorded by Thorndike and Fergusson (1938), 106 (6%) were irreducible, but only 5 required resection of the intestine; and among the 1000 cases of Herzfeld (1938), only one, a baby 12 days old, needed resection. At the Hospital for Sick Children, Great Ormond Street, since the beginning of 1938 468 cases of inguinal hernia have been operated on: 6 were irreducible (1·3%) and in only 2 of these was intestinal resection necessary.

It is a common belief that gut resection in infancy has a mortality-rate of 100% (Gordon 1940). Of the cases treated at Great Ormond Street, the first to require resection of small intestine died on the 14th day with numerous intraperitoneal abscesses, apparently secondary to leakage from the anastomosis. The second, however, recovered.

The child was a firstborn full-term male delivered on Nov. 7, 1942, after a normal labour; his birth-weight was 6 lb. 5 oz. and he was breast-fed. On Nov. 25 he began to vomit and ceased to pass motions. Two days later the mother noticed a lump in his right groin and he was admitted to hospital.

By that time he was ill, pale and dehydrated, and was crying continuously. The abdomen was distended and tense and the umbilicus prominent. From the right groin a large firm, tender, red and œdematous mass extended down into the scrotum. The penis and the left side of the scrotum were grossly œdematous. There was fæcal vomiting with constipation.

Just before operation 3½ hours after admission a stomach-tube was passed to empty the stomach. After its removal, anæsthesia was induced with ethyl chloride and open ether (preceded by atropine, gr. 1/200). An oblique incision in the right groin exposed the sac of a large indirect inguinal hernia containing a strangulated loop of small intestine, 3 in. of which was gangrenous. After dividing the constricting band at the neck of the sac, the gangrenous portion with adjacent healthy bowel (4 in. in all) was resected. The ends of the proximal and distal segments of the intestine were then ligatured, the stumps being invaginated with a catgut purse-string suture on an atraumatic intestinal needle. A side-to-side anastomosis was next performed; no intestinal clamps were used, the loops of the intestine being held by the assistant's fingers; 6/0 catgut on an atraumatic intestinal needle was employed. The anastomosis was performed in the usual way so that there were two layers of sutures. A sucker was used for removing the contents of the gut which tended to escape. The length of the anastomosis was ¾ in. Omentum was not wrapped round the suture line and sulphanilamide powder was not applied.

While the anastomosis was being formed the child vomited and stopped breathing. A stomach-tube was passed and the stomach again emptied; oxygen and nikethamide ('Coramine') were administered and he revived. When the intestines had been replaced in the peritoneal cavity, the peritoneum was closed with a single purse-string catgut suture to hold back the abdominal viscera. No attempt was made to repair the hernia. The skin was sutured with interrupted sutures and a firm pad was fixed tightly over the right groin.

After operation the child was given nothing by mouth, but received glucose-saline by intravenous drip at the rate of ¾ oz. per hour. When fæcal vomiting began again at midday next day (Nov. 28) an ordinary stomach-tube was passed and attached to a continuous-suction apparatus, working at a negative pressure of 1½ in. Hg. Much fæcal material was obtained through this tube. A normal stool was passed 44 hours after operation, and 4 hours later feeding by mouth was commenced, starting with 1 drachm of glucose-water hourly and increasing by a drachm every 4 hours. The suction was stopped for half an hour after each feed and then restarted: it was finally discontinued 54 hours after operation. Intravenous infusion was continued for 2½ days. Breast-milk feeds were slowly introduced and on the 7th day the child was back on the breast and taking his feeds well. Apart from some suppuration in the wound and a boil on the buttock recovery was thereafter uneventful.

Four factors may have helped this baby to survive. (1) Great care was taken over the anastomosis, but otherwise the operation was performed as quickly and as simply as possible: there was no attempt at a repair. (2) By holding the bowel in fingers instead of clamps, a minimum of trauma was inflicted on the bowel. (3) All feeding by mouth was stopped for 2 days after the operation, the fluid intake being maintained by continuous intravenous infusion of glucose-saline. (4) The proximal part of the alimentary tract was kept empty by continuous suction through a stomach-tube for 2 days.

My thanks are due to Mr. Graham Humby for permission to publish this case.

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PERFORATION OF RECTUM FROM IMMERSION BLAST

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IN March, 1941, when a cruiser was torpedoed in the Mediterranean, an ordinary seaman, aged 28, was thrown into the water. Destroyers were dropping depth charges in the neighbourhood, and one exploded near him; how near he did not know—he remembered being winded, but little else. He was picked up, and 14 hours after the torpedoing of the cruiser was admitted to a hospital ashore.

On admission to hospital the patient showed no external signs of wounding or bruising. He was complaining of severe lower abdominal pain, worst in the right iliac fossa. He was also passing a small amount of bright red blood from the anus. His general condition was none too good; temperature 100° F. and pulse-rate 120 per min. He had not vomited. The abdomen was rigid all over, more especially in the right iliac fossa. There was no distension. On auscultation of the abdomen there was complete silence. A rectal examination was not done, as it was thought further damage might be done to the injured part.

After a preliminary infusion of saline and glucose, a laparotomy was performed under oxygen and ether anæsthesia. A left paramedian incision was made and pus was seen in the peritoneal cavity. The first part of the rectum on its anterior surface showed a lacerated bruised perforation about 1 cm. in diameter. The rest of the rectum appeared healthy and normal. The perforation was oversewn and buried with a purse-string suture. The abdominal contents were rapidly searched for any further injuries, but none was found. A pelvic colostomy with a long spur was made. The pelvis was drained and the abdomen closed. A transfusion of 2 pints of blood was given. His condition was poor at the end of the operation.

Next day there was well-marked jaundice and his condition deteriorated. On the third day paralytic ileus became evident, distension and vomiting started, and his pulse-rate rose to 140 per min. Duodenal drainage, intravenous drip salines and small repeated doses of morphine were of no avail, and he died 52 hours after operation.

At autopsy general peritonitis was found, originating in the pelvis, with paralytic ileus involving the whole small bowel.

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There was an enlarged septic spleen. The right lung showed a contusion on the anterior surface near the medial and inferior margins; hypostatic congestion was present at both bases. No evidence of internal hæmorrhage was found. The heart, kidneys and liver appeared normal macroscopically. Evidence of a rupture some ½ in. in length in the rectum was found; this had been stitched together and was in the process of healing.

Here is a case of blast abdomen causing intraperitoneal perforation of the first part of the rectum, due, as Williams [1] has very reasonably conjectured, to a pressure wave travelling in a fluid medium meeting a gas-containing organ. Williams in his experiments showed that the commonest effects of blast injury to the abdominal contents were subperitoneal and submucosal effusions of blood. This case showed no subperitoneal hæmatomata, but unfortunately the mucosa of the alimentary tract was not examined post mortem.

Several cases have now been described where, after immersion blast injury, severe abdominal pain and melæna have been present, and recovery has taken place without operative interference. In these cases, presumably, the pathology was that described by Williams. However, resolution does not necessarily occur, and the condition may progress to necrosis and secondary perforation.

This case is of interest in that perforation of the rectum was a primary event in a single organ, with no evidence of other abdominal injury.

Reviews of Books

Cunningham's Text-book of Anatomy

(8th ed.) Editors: J. C. BRASH, MD BIRM., FRCSE; E. B. JAMIESON, MD EDIN. (Oxford University Press. Pp. 1558. 60*s*.)

THIS book has developed steadily as a reliable guide to the student, and a few criticisms may therefore be offered in a helpful spirit. The section on craniometry is not of great use to the medical student, but in any case it would be well to omit Huxley's obsolete classification of skulls into cryptozygous and phænozygous, since under which of these two any skull falls depends entirely on the distance from which it is viewed. The section devoted to the morphology of the limb bones contains one or two debatable statements, and in the section of myology the remark that "When the teeth are tightly clenched, the hyoid bone will be found firmly fixed" seems to be invalidated by the fact that swallowing can be performed with the teeth clenched. In one of the new figures the mucous glands of the palate are depicted well forward on the hard palate and lying along the middle line; the text, however, correctly states that these glands are situated "in the posterior half of the hard palate, except near the raphe." Another attractive new illustration (fig. 374), which might lead one to suppose it had been drawn from an actual specimen, shows the membranous layer of the superficial fascia of the abdominal wall joining with the deep fascia of the thigh along the line of the inguinal ligament. In the text it is described as joining "just distal" to the ligament. In Cunningham's *Manual of Practical Anatomy* the line of fusion is described correctly. Correlation between the *Manual* and the *Textbook* again fails in the account of the descent of the testis; the student who, it is to be hoped, has encountered the correct figures in the *Manual*, will be disconcerted to meet incorrect ones in the *Textbook*. Attention is drawn to these little oversights only because "Cunningham" has grown so trustworthy in general. It has also grown in size and in cost, weighing nearly six pounds and costing three.

Essentials of Gynecology

WILLARD R. COOKE, MD, FACS, professor of obstetrics and gynecology, University of Texas. (Lippincott. Pp. 474. 42*s*.)

Professor Cooke has concentrated on pathology in the conviction that in gynæcology intelligent judgment is impossible without a working knowledge of it. The text is illustrated by photographs; those showing macroscopic appearance are good, and so are most of the photomicrographs, but a few are poor and deserve to be replaced in future editions. An unusual but valuable chapter is devoted to the patient herself, her mode of life and psychology. Another long chapter deals with functional disturbances. Stating that 95% of human suffering is mental, Dr. Cooke rightly observes that the removal of a bleeding fibromyoma may actually make the patient subjectively worse if she is left to welter in fear and apprehension as to the end-results of the operation. The chapter on operative gynæcology is not intended to serve the needs of the surgical specialist but to provide the practitioner with a working knowledge of preoperative and postoperative care. In contradistinction to the care and attention directed to the subjects mentioned above, the treatment of the so-called "minor" ailments by the patient's own doctor deserves more detailed attention than it receives. In the section on the treatment of dysmenorrhœa presacral sympathectomy claims almost as much space as all other methods of therapy combined. With these few exceptions this is a sound work and it has been beautifully produced.

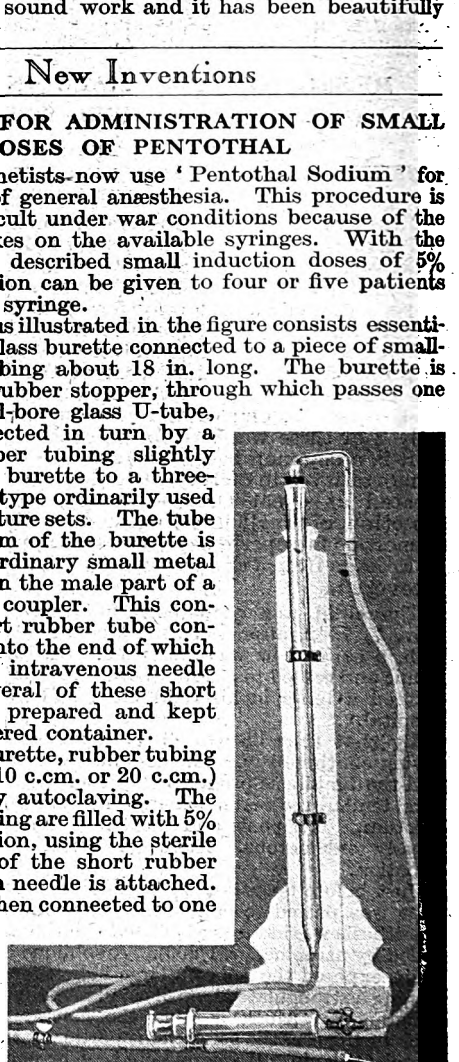
1. Williams, E. R. P. *Brit. J. Surg.* 1942, 30, 38.

New Inventions

APPARATUS FOR ADMINISTRATION OF SMALL DOSES OF PENTOTHAL

MANY anæsthetists now use 'Pentothal Sodium' for the induction of general anæsthesia. This procedure is sometimes difficult under war conditions because of the demand it makes on the available syringes. With the apparatus here described small induction doses of 5% pentothal solution can be given to four or five patients with one sterile syringe.

The apparatus illustrated in the figure consists essentially of a plain glass burette connected to a piece of small-bore rubber tubing about 18 in. long. The burette is corked with a rubber stopper, through which passes one arm of a small-bore glass U-tube, which is connected in turn by a length of rubber tubing slightly longer than the burette to a three-way tap of the type ordinarily used in lumbar-puncture sets. The tube from the bottom of the burette is fitted with an ordinary small metal tap, and ends in the male part of a male to female coupler. This connects to a short rubber tube connector (4 in.), into the end of which the butt of the intravenous needle is forced. Several of these short connectors are prepared and kept sterile in a covered container.



For use the burette, rubber tubing and a syringe (10 c.cm. or 20 c.cm.) are sterilised by autoclaving. The burette and tubing are filled with 5% pentothal solution, using the sterile syringe. One of the short rubber connectors with needle is attached. The syringe is then connected to one of the open arms of the three-way tap. The tap is turned, so that when the plunger of the syringe is withdrawn air is drawn in through the other side arm into the syringe. The tap is then turned so that the syringe makes connexion with the rubber tubing leading to the top of the burette. The needle is inserted into the patient's vein and the tap in the delivery tube is opened. Air is injected into the top of the burette by advancing the plunger of the syringe, and displaces an equal volume of pentothal, which is delivered into the vein. The required amount of pentothal having been delivered, the tap in the delivery tube is closed and the needle withdrawn. The short connector is removed and discarded. The free end of the delivery tube is wrapped in a sterile gauze swab wet with alcohol and placed in a sterile test-tube. The syringe is left in place. For subsequent patients a fresh sterile needle and short connector is attached.

R. A. GORDON, MD TORONTO, D A
Major, RCAMC

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THE LANCET

LONDON: SATURDAY, NOVEMBER 13, 1943

NO RECOVERY NO GRANT

Mr. BEVIN'S dramatic announcement early in the year that those who drop out of employment as a result of tuberculous infection are to have precisely the same chance of getting back into it as those who have suffered wounds or accidents seemed too good to be true. In one respect it was, for the MINISTER OF HEALTH has ruled that the Exchequer grant is to enable persons to give up work temporarily "for treatment which is in the interest of the public health no less than their own." Only those are eligible whose recovery is sufficiently sure to make them a realisable asset to the man-power of the nation in war-time. On the tuberculosis officer falls the invidious task of drawing the line. If he says "no recovery" the Exchequer says "no grant": and the patient loses both the money and the incentive to get well. It is true that in any case he may receive money through the local authority which can, and ultimately indeed must, provide assistance when the Exchequer refuses it; indeed in some places it seems that such assistance is not far short of the grant. But it is not just a question of accounting; the press has been full for weeks of the bitterness (reflected in our Parliamentary column this week) which is being aroused by the distinction between recoverable and irrecoverable disease. The line is impossible to draw with any accuracy. It had to be drawn for sanatorium benefit in the unhappy period before the Public Health Act of 1921 swept it away. Tuberculosis officers are not infallible and there are borderland cases in which the encouragement of a grant might well turn the scale towards recovery. There is a feeling too that the MINISTER himself regretted the reservation, as it was not mentioned in his explanatory leaflet to the public; moreover the premature discharge of the grantless from hospital or sanatorium must be contrary to the public health, on which he lays such stress. Do not the invidiousness and the unhappiness and the increased risk of infection outweigh any small saving of public money? Unless the scheme is made comprehensive, in accordance with its first intention, shall we not drift into the position that the state only helps the sick civilian in proportion to his capacity to return the help in services rendered? On the field of battle we do not give priority treatment to the casualties who are expected to fight again.

DRUGS AND THE EEG

THE electro-encephalogram is an excellent, and possibly the best, physiological gauge of depression of the highest cerebral functions. Impairment of consciousness or increased attention is reflected in a shift of energy distribution towards the slow or fast end of the cortical frequency spectrum. Drugs which affect consciousness modify the EEG, so that the EEG gives us an objective method of studying one aspect of drug action, but the modifications are difficult to describe without the assistance of automatic frequency analysers. The human visual apparatus is an integrating mechanism, not an analyser; events tend to be perceived as a whole, and the minor changes in potential distribution which most drugs produce are readily overlooked. But the advent of apparatus for automatic frequency analysis in America,[1] and now in England,[2] has made the accurate assessment of changes in cortical frequency reasonably easy, and drug action on the EEG is now being studied in detail.

Working with a Grass frequency analyser, GIBBS and MALTBY [3] found, as was expected, that the drugs known clinically as depressants or stimulants can be sorted into the same two groups by the EEG changes they produce. Thus morphine, 'Pentothal' and phenobarbitone redistribute energy towards the slow end of the spectrum, whereas caffeine, amphetamine ('Benzedrine') and adrenaline cause a shift towards the fast end. In their effects on the EEG, therefore, the depressant drugs are comparable to normal sleep and the stimulants to attention. Of the drugs studied, pentothal, which produced the greatest clinical depression, caused the greatest shift towards the slow end of the spectrum, and adrenaline produced both the greatest clinical stimulation and the greatest shift towards the fast end, amphetamine coming next and caffeine third. In this way the activity of drugs with a similar action can readily be compared.

In cases of petit mal, WILLIAMS and RUSSELL [4] have studied in the EEG the effect of anticholinesterases on epileptic activity. In small doses eserine tended to prevent attacks, while in larger ones it increased their frequency and duration. 'Prostigmin,' on the other hand, invariably increased epileptic activity as seen in the EEG, and reversed the effect of small doses of eserine. WILLIAMS [5] used the same technique to investigate the effect of other substances known to modify transmission at cholinergic endings. Intravenous injection of acetylcholine was followed by an increase of epileptic activity, and this effect was abolished by atropine. Since eserine, prostigmin, carbaminoylcholine chloride and acetycholine have a similar action on cerebral rhythms in epileptics which is abolished by atropine, it seems likely that this action is related to an alteration in the acetylcholine-transmitting mechanism in the body; but WILLIAMS points out that the effect may be an indirect one, due to peripheral changes, since the effects of choline-like substances are so widespread and complex. CHATFIELD and DEMPSEY [6] applied acetylcholine and prostigmin locally to the cortex of cats. They found that acetylcholine alone produced no change in the cortical rhythms and prostigmin a transient depression of spontaneous activity at the area of application. When prostigmin was followed by acetylcholine a characteristic series of changes occurred. There was first an increase of spontaneous activity, then an increase of low-voltage 20–30 cycle rhythms which spread over the whole cortex while the amount of 5–10 cycle rhythms decreased. The effect of a single peripheral stimulus on this preparation was to

1. Grass, A. M. and Gibbs, F. A. *J. Neurophysiol.* 1938, 1, 521.
2. Walter, W. G. *Electronic Engineering*, June, 1943.
3. Gibbs, F. A. and Maltby, G. L. *J. Pharmacol.* 1943, 78, 1.
4. Williams, D. J. and Russell, W. R. *Lancet*, 1941, 1, 476.
5. Williams, D. J. *J. Neurol. Psychiat.* 1941, 1, 32.
6. Chatfield, P. O. and Dempsey, E. W. *Amer. J. Physiol.* 1942, 135, 633.

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leave the cortical response unchanged, but when repeated stimuli were given the cortical response was increased. All these effects, except the low-voltage fast activity, were abolished by section of the thalamic radiations, and from this CHATFIELD and DEMPSEY argue, first, that low-voltage fast activity is intrinsic to the cortex itself, not requiring thalamic circuits, and secondly, that since activity associated with spontaneous bursts and continuous 5–10 cycle rhythms is abolished by removal of the thalamus, such effects represent activity of thalamo-cortical circuits. However this may be, it is evident that the application of EEG technique to the study of the action of drugs on the central nervous system may well advance our knowledge, not only in pharmacology but also in neurophysiology and clinical medicine.

HÆMOLYTIC FACTORS

IT is not difficult to show that excessive hæmolysis, or destruction of red blood-cells in vivo, is the characteristic feature of an anæmia. But when we have diagnosed "hæmolytic anæmia" we have not got much further; in order to treat that anæmia, the reasons for the hæmolysis must be known. The antibody reactions connected with the Rh factor of LANDSTEINER and WIENER have been proved responsible for some at least of the hæmolytic anæmias of infancy; but, apart from certain known hæmolytic poisons, this is so far the only hæmolytic group about which we have certain information. When spherocytes were demonstrated in the blood of patients with familial acholuric jaundice, it was suggested that these cells were being produced by a disordered bone-marrow and were abnormally fragile, the fragility being measured by testing with hypotonic saline solutions. Further research, however, has shown that spherocytes can be produced by artificially induced hæmolysins, and they have been found in other conditions. DAMESHEK and SCHWARZ,[1] using such artificial hæmolysins, reproduced a whole series of hæmolytic anæmias corresponding to most of the known syndromes, but it has nearly always been impossible to demonstrate any circulating hæmolysin in human hæmolytic diseases.

This fragility of the red blood-cells has been elaborately studied, not only with hypotonic saline but also with a substance known as "lysolecithin" which is thought especially to affect red cells held in the spleen. Estimation of "lysolecithin fragility" is difficult but has been done because in some hæmolytic conditions the red cells show an increased lysolecithin fragility but a normal fragility in saline. One of these conditions is blackwater fever, which has been extensively studied because of its severity and its danger to life and because it is a pattern of hæmolytic disease. FOY and KONDI,[2] like others before them, report that the lysolecithin fragility is undoubtedly increased in this disease, but they can make little use of the information; they cannot accept the thesis that blackwater fever is due to some effect of the malarial parasites on the erythropoietic tissues of the victim, since they showed before[3] that normal red cells transfused into blackwater fever patients are destroyed in exactly the same way as the patient's cells, so that no fundamental defect in the red cells can be assumed. They also found that though lysolecithin has a hæmolytic action in vitro, no such action can be demonstrated in vivo.

It cannot honestly be said that these often difficult and elaborate studies of red-cell fragility have helped to explain the mechanism of hæmolysis, although we have learnt a lot from them about the properties of the red cell itself. Is it possible that we are asking the wrong questions and so receiving, in Nature's off-hand way, no sensible answers? MAEGRAITH, FINDLAY and MARTIN[4] have started a new approach to the problem of blackwater fever hæmolysis that may prove more fruitful. They have shown that slices of human tissues contain a factor that will lyse saline suspensions of red blood-cells; human serum, on the other hand, contains a factor that inhibits this lysis, and in blackwater fever they found that the inhibitory power of the serum is much reduced. They therefore suggest that there is no abnormal lysin in the blood of blackwater fever patients, "the lysis is simply a manifestation of excessive uninhibited activity of a normal lytic process." These findings await confirmation but sound promising; material for study is, unfortunately, easy to come by.

NO PLACE LIKE HOME, BUT . . .

THE return of the repatriated prisoners from Germany offers the War Office and the Ministries of Labour and Pensions an opportunity for a large-scale experiment in social rehabilitation before they are called upon to meet the more massive problems which will follow the end of the war in Europe. The training of the physically handicapped man, so that he can take his place in the industrial world, is familiar work to the Ministry of Pensions. But the mental state of the repatriated prisoner is a more subtle matter. There will of course be the gross casualties—the man who returns to find his family has perished in the blitz or has disintegrated for other reasons; but such cases will be few. In the prison camp, every prisoner will have built up a mental picture of home, and this fantasy may bear little relation to the real thing. After highly emotional episodes, life for all of us is apt to seem dull and flat. For the repatriated prisoner, this anticlimax will coincide with a realisation that home is not without its drawbacks and irritations. It would not be unreasonable to predict the development of something in the nature of a reactive depression, which will call for careful handling. After a brief holiday, a return to kindly but firm discipline might not come amiss, coupled with a steady increase in physical work. Interest in current affairs might be reawakened at the same time by lectures and discussion groups. Some may feel, however, that the man has a better chance of working out his own salvation in the cold hard world. We have a chance to try out both methods. If two groups of repatriated prisoners could be treated along these lines, with adequate psychiatric observation of both groups, they might well provide the necessary data for planning the mental rehabilitation of the other prisoners of war.

1. Dameshek, W. and Schwarz, S. O. *Medicine* (Baltimore), May, 1940, p. 231.
2. Foy, H. and Kondi, A. *Trans. R. Soc. trop. Med. Hyg.* 1943, 37, 1.
3. See *Lancet*, 1941, ii, 530.
4. Maegraith, B. H., Findlay, G. M. and Martin, N. H. *Ibid*, 1943, i, 573.

THE next session of the General Medical Council will open on Tuesday, Nov. 23, at 10 AM.

Prof. L. G. PARSONS will deliver the first Charles West lecture at the Royal College of Physicians of London next Tuesday, Nov. 16, at 2.15 PM. He will speak on the prevention of neonatal disease and neonatal death.

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Annotations

AN ANTIBIOTIC FROM ASPERGILLUS

SINCE the discovery of penicillin by Fleming and its exploitation by Florey and his colleagues, systematic search has been made through large numbers of moulds and similar organisms for substances with antibacterial activity. In addition to gramicidin, which had been discovered earlier by Dubos, several compounds of different types have been brought to light, such as pyocyanin and notatin. The latest to be described comes from *Aspergillus fumigatus* mut. *helvola* Yuill. Antibacterial activity was reported from the culture filtrates of this fungus by Wilkins and Harris [1] and the active substance in a crystalline state has been isolated by Chain, Florey, Jennings and Williams [2] who give a detailed account of its chemical and biological properties. It seems to be a monobasic acid with the probable empirical formula $C_{32}H_{44}O_8$, and has been named helvolic acid; though soluble in most organic solvents it is insoluble in water, though its sodium salt is freely water-soluble. It is thermostable and stands boiling for 15 minutes. Helvolic acid is distinct from the substance isolated by Waksman and his colleagues [3] from *Aspergillus fumigatus* and named fumigacin. Its antibacterial action is directed mainly against gram-positive organisms and it has little action on gram-negative ones. Thus in concentrations of 1 : 100,000 to 1 : 1,000,000 it prevents the growth of staphylococcus, pneumococcus, *Strep. pyogenes*, *B. anthracis*, *C. diphtheriæ*, *Cl. welchii* and others, but it fails to check typhoid, dysentery or coliform bacilli, proteus or *Ps. pyocyanea*. The dilution at which it inhibits growth depends greatly on the size of the inoculum used, small numbers of bacteria being checked much more readily than large ones. Its action is predominantly bacteriostatic : it prevents multiplication but does not kill the germs. This effect is not inhibited by *p*-aminobenzoic acid, by pus, tissue extracts or peptones ; so that it is clearly differentiated from the inhibition due to sulphonamides. Bacteria cultivated in the presence of subeffective concentrations rapidly become drug-resistant and are no longer susceptible to the action of the compound ; but such helvolate-resistant organisms are still susceptible to penicillin. Helvolic acid is not unduly toxic to mice, the maximum tolerated dose of the sodium salt by intravenous injection being about 5 mg. per 20 g. body-weight ; much larger doses are tolerated by mouth. Leucocytes are not affected by concentrations up to 1 : 1600, and tissue cultures tolerate concentrations of 1 : 2500 for 48 hours. Some of it may persist in the blood of mice for 6–10 hours after administration. It is slowly absorbed along the whole length of the gastrointestinal tract and there seems to be no destruction of it by bacteria in the lumen of the gut ; it is gradually excreted in the urine and bile. In the tissues it becomes concentrated, chiefly in the liver, and only traces were found in the spleen ; apparently it does not pass easily from the blood to the cerebrospinal fluid. When injected intravenously into a cat it had no significant influence on the cardiovascular or other systems ; no symptoms were caused by moderate doses injected intracisternally into rabbits. Its chief toxic effect seems to be on the liver, large or repeated doses causing extreme vacuolation and finally destruction of hepatic cells. In face of so much chemical, bacteriological and pharmacological information it is disappointing to learn that its therapeutic action in vivo is small. Mice were infected with staphylococci or streptococci and an hour later treatment with helvolate was begun. The life of the mice was undoubtedly prolonged, but complete cures were few. These tests were performed on only a small number of animals, and it may be that a different dose-schedule might give better results. Yet even if helvolic acid itself proves to have little clinical value it belongs to a group of substances hitherto unexplored for antibacterial properties ; and chemical modification of the molecule may yield compounds much more active and no more toxic.

1. Wilkins, W. H. and Harris, G. C. M. *Brit. J. exp. Path.* 1942, 23, 166.
2. Chain, E., Florey, H. W., Jennings, M. A. and Williams, T. I. *Brit. J. exp. Path.* 1943, 24, 108.
3. Waksman, S. A., Horning, E. S. and Spencer, E. L. *Science*, 1942, 96, 202 ; *J. Bact.* 1943, 45, 233.

SILICOSIS IN SWEDEN

SILICOSIS was added to the list of occupational diseases in Sweden in 1930. From 1934 onwards, Bruce [1] carried out surveys in various industries in which a risk of silicosis was suspected, and investigated silicotic workers clinically, assessing the disability at various stages of the disease. Altogether, 6500 workers in Sweden are estimated to be exposed to a silicosis risk, about half of these in mining, chiefly of iron ore. Iron and steel production and ceramics account for the bulk of the remainder. About 40% of all these workers were examined and X rays were taken of two-thirds of them. Bruce classifies the X rays according to the three stages defined by the 1930 international conference, but adds a fourth category of suspected silicosis, characterised by linear or reticular shadows. He pays particular attention to the incidence of tuberculosis and its relation to silicosis. The industries surveyed covered ceramics, iron and steel works, silicon-alloy manufacture, sandstone quarrying and grinding, quartz mining and milling, and mining. In several industries part of the survey was repeated after 3–5 years, or earlier results obtained by other investigations were utilised, in order to estimate the rate of progress of the lung changes. Of 2631 persons from various industries examined, 408 showed stage 1 of silicosis, 141 stage 2, and 76 stage 3. As would be expected, the hazard varies very much with the type of work. Thus stage 3 was first reached in under 5 years in quartz milling, after 10–15 years in cleaning castings (fettling), after 15–20 years in furnace repairing (iron and steel) and drilling iron ore, after 25–30 years in porcelain works, and after 35–40 years in foundry casting. After 20–25 years of work all the sandstone grinders, 60–70% of the porcelain workers, furnace repairers, fettlers and drillers in iron ore, but only 2% of the foundry casters had silicosis of one stage or another. The repeat survey led to the impression that, if it takes a long time to reach stage 1, there is in general little tendency towards further change, even if dusty work is continued ; whereas if stage 1 is reached quickly further lung changes may occur even if the dust exposure ceases. Drilling iron ore seems to be an exception, for drillers contracted stage 1 comparatively rapidly but there was little progress towards further change ; this may be due to the quartz in the dusts being diluted with much iron oxide. The X-ray appearances showed differences for the different occupational groups. Thus linear exaggerations (reticulation ?) are well-marked in porcelain workers but absent in iron-ore drillers, whereas foundry casters and furnace repairers take an intermediate position. With porcelain and silicon-alloy workers, and in quartz milling, the nodules have irregular shapes and diffuse boundaries and are not very dense. With the other occupations examined, particularly in iron-ore drillers, the nodules are round, more clearly defined and denser. In advanced silicosis lateral X rays show the boundary between consolidated and emphysematous parts of the lungs to have a different position for different types of occupation. Bronchographic technique shows dislocations and changes in lumen of the bronchi. Routine clinical tests showed that the average age increased from stage 1 to stage 3. No tendency to adiposity but a slight reduction in thorax mobility was seen in stage 3. The clinical observations, apart from the X rays, were chiefly concerned with objective

1. Bruce, T. *Acta med. scand.* 1942, Suppl. 129.

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measurements of the impairment of lung function during rest and work. For analysis of these clinical tests the three silicotic stages were subdivided into (*a*) those without subjective symptoms, (*b*) those with dyspnœa and partial disability, and (*c*) those with total disability. Extensive spirometric measurements during rest showed no significant differences for minute-ventilation or oxygen-ventilation equivalent, but stage 3, and particularly group 3*c*, showed a higher respiration frequency and reduced total capacity, due to a reduction of the complementary air, not of the functional residual air. Spontaneous hyperventilation led in many stage 3 cases to a rise of expiration level. When spirometric measurements were carried out during work (stair-climbing), respiratory insufficiency was only found during the heaviest type of work with stage 1; it increased with stage 2 and was very frequent even with the lightest type of work with stage 3. Other affections of the cardiopulmonary system in combination with silicosis usually caused greater insufficiency. Bruce's survey gives a good picture of the level and variation of hazard found in Sweden, while the clinical part of his book brings out the relation between lung function and anatomical change of the lungs. But he does not contribute to our knowledge of how and why the dust causes the lung changes.

THE UNSUITABLE SOLDIER

EVERYBODY agrees that men of neurotic disposition who are very likely to break down in the Services should be spotted and rejected at the outset. Few people however have the hardihood to say that we have any sure means of detecting nearly all such people at the outset, if they have not already had, or still exhibit, a neurotic illness. There is a big gap between contending that manifestly predisposed and unsuitable men should have been recognised as such, and asserting that all those who have subsequently broken down once were manifestly predisposed and unsuitable. The gap has been made narrower by the intelligent use of wisdom after the event, as in studies of the abnormal traits of personality which are discovered to have been commonly present in the men who subsequently broke down. Steinberg and Wittman [1] point out that such studies are of doubtful value until we know the frequency with which the same traits occur in people who do not break down. For this reason they examined three groups of soldiers—158 presumably healthy men attached to the Army Medical Corps, 22 soldiers in the psychiatric unit of a general hospital, and 87 patients in the Veterans unit at a mental hospital. The men in the second group were suffering almost entirely from neurotic illnesses, and those at the mental hospital had been, or were still, insane. The investigation was a thorough one, covering the customary material of a psychiatric history as well as special psychological tests aimed at the elucidation of the patient's personality. The Guilford personality scale was employed, and personality was accordingly assessed in terms of the five factors—social introversion, thinking introversion, depression, cycloid tendencies, and care-free disposition and impulsiveness. The control group differed strikingly from the other two. Whereas half the neurotics and psychotics were socially introverted and depressive or cyclothymic, among the controls one-third or less showed such features, and 84% of them were care-free and lively—a characteristic found only in about a quarter of the men with psychiatric illness. It was also found that the relationship of the men to their parents, especially to their mother, had been far more satisfactory among the control group, and that a history of social and sexual maladjustment in early home and school life had been prominent in the psychotic soldiers, though not in the neurotic or healthy ones. There was a striking difference in the average number of jobs and in the longest time any single job had been held; the maladjusted men had on the average held two or three times as many positions as the control group, and there was a similar proportion in the duration of individual jobs. Teetotallers were more numerous among the maladjusted; so were divorced persons.

It would not be prudent to accept these findings as they stand, though the method is a proper one. The numbers chosen, particularly in the neurotic group, are far too small for it to be certain that the sample is representative; in support of this objection is the fact that 20% of the neurotic subjects, and 38% of those in the mental hospital are reported to have shown homosexual traits—a remarkably high proportion. It would be necessary to know how the men were selected, how far the history of their past lives was obtained from reliable sources, and whether the men of the Medical Corps unit in question differed in any material respect from the average run of men in other branches of the Service. It is also open to question whether a healthy man takes as much trouble in giving full replies to a questionnaire about his personality and history, especially in its more shadowed aspects, as a patient with a psychiatric illness. Nevertheless, further investigations of this sort on a larger material would be welcome, and the recommendations put forward by Steinberg and Wittman deserve attention. They point out that any one specific factor or symptom is of limited importance since it may occur also in well-adjusted persons, but that the intensity and number of such factors, recorded as a numerical value or score, provides a useful indicator which might well be used as a routine measurement of predisposition. A rating form satisfactorily standardised and so arranged as to indicate how the man had reacted to army life can be filled out by the immediate superior officer or medical officer of the man's unit and is very helpful to the psychiatrist to whom he may be referred.

1. Steinberg, D. L. and Wittman, M. P. War Medicine, August, 1943, p. 129.

REGENERATION OF NERVE

KNOWLEDGE of the rate of nerve regeneration is useful for determining the time at which recovery may be expected after nerve suture, and still more important in cases where nerves have been injured but not sutured. Absence of exact information about the time at which spontaneous recovery may be expected probably leads to undue delay before exploratory operation in many of these cases. The rate which is required is of course not that of the advance of the tips of the new fibres. Thin nerve-fibres may reach a muscle long before it shows recovery. Before the new stretch of nerve can function the nerve-fibres must thicken and medullate. By studying the time at which function returns in muscles at various distances from the lesion we can therefore estimate the rate of advance of what may be called functional completion [1] along the nerve. Seddon, Medawar and Smith [2] have made a careful study in this way of the rate of recovery in 25 cases, mostly in the radial nerve. The distance from the lesion (or suture) to the various muscles was estimated from a series of dissections. Recovery was found to take place in a regular serial manner, but plots of the distance of each muscle from the lesion against the time of recovery often do not give straight lines, suggesting that regeneration is fast at first and becomes slower for the more distal muscles. There is, therefore, no constant "rate of regeneration." The data are not sufficient to allow the shape of the curve describing the decline to be discovered accurately, but Seddon and his colleagues suggest that it may be a hyperbola, the rate being inversely proportional to the square of the time, beginning as high as 3 mm. a day,

1. YOUNG, J. Z. *Physiol. Rev.* 1942, **22**, 318.
2. Seddon, H. J., Medawar, P. B. and Smith, H. *J. Physiol.* 1943, **102**, 191.

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and falling to about 1 mm. a day at 100 days or so after recovery has started. This would agree with the findings of Gutmann and others [3] that regeneration to the level of functional completion may proceed down the short nerves of rabbits as fast as 3·5 mm. a day. Until more is known of the course of decline in the rate of recovery average values can be used for comparing the results after different types of lesion. The rate per day in the radial nerve after suture was found to be 1·6 mm. as the average of 6 cases, with variations between 1·0 and 2·4 mm. In 10 cases of "spontaneous" recovery (axonotmesis) the average rate was 1·5 and the limits 0·7 and 2·1 mm. per day. The rate of recovery in 14 cases of suture of radial nerve described by Stopford [4] can be calculated in the same way, and proves to be only 0·6 with extremes of 0·4 and 0·7 mm. per day. The reason for the strikingly faster rate in the recent cases remains obscure. The possibility of making such comparisons shows the value of the method. It is to be hoped that with the careful following of cases now being undertaken at the various nerve injury centres still more exact estimates and further information about the variables which affect the rate of nervous regeneration will be obtained. This should help considerably in the diagnosis, prognosis and management of these cases in which the long delay before recovery is such a difficult feature.

FEEDING THE EAST AFRICAN FORCE

THE Africans serving in the campaign which restored Abyssinia to the Abyssinians were drawn from nearly 200 tribes. In a single round at the large base hospital for African soldiers at Nairobi it was possible to see men from Nigeria, the Gold Coast and other colonies on the West Coast, black and coloured men from all parts of South Africa, and tribesmen from the Rhodesias, Nyasaland, Kenya, Uganda and Tanganyika; Somalis and occasionally Abyssinians. Most of these people had their own dietetic preferences and different methods of preparing their food, and the difficulties of catering for such a heterogeneous collection of people seemed almost insuperable in hospital. On active service conditions were naturally different, and every race, with the sole exception of the Somalis, accepted the common Army ration. This remarkable breakdown of the innate conservatism of the African in the matter of food—a conservatism which is held to be responsible for much of the malnutrition in Africa—should, as Farnworth Anderson [5] points out, have a considerable influence when these thousands of men return home. A former director of Army Medical Services in East Africa reported that the low incidence of disease in the troops was largely due to the fact that the supply of food had been on the whole well maintained. During the first year the deaths from sickness in the African troops stood at the remarkably low rate of 3·4 per 1000 per annum. Anderson records that the average admission-rate to hospital for food-deficiency diseases between June, 1940, and the end of 1942 was only 0·72 per 1000 per annum. Deficiencies of vegetables and fruit were overcome to some extent by the issue of ascorbic acid tablets imported from home. These were later replaced by sweet capsicum or paprika, sprouted pulses and native beer, and by dehydrated vegetables produced at Keruguya in Kenya. Large quantities of these dehydrated vegetables were later sent to the Middle East. Patients with vitamin-A deficiency were given ghee and red palm oil. Calcium was supplied where required by the addition of bone-meal or precipitated chalk to the cereals. A local outbreak of beri-beri from unpolished rice used by the Somali was rapidly controlled by the issue of a millet sorghum. While giving due credit to Brigadier Orenstein and his colleagues in the medical department for these satisfactory results, high praise must also go to the supply and transport services, working over lines of communication often 2000 miles long, and using roads which in many parts were almost impassable.

3. Gutmann, E., Guttmann, L., Medawar, P. B. and Young, J. Z. *J. exp. Biol.* 1942, 19, 14.
4. Stopford, J. S. B. *Brain*, 1920, 43, 1.
5. Anderson, T. F. *E. Afr. med. J.* 1943, 20, 297.

CHEST TROUBLES AFTER HERNIA OPERATIONS

THE chief bugbear of the anæsthetist is still post-anæsthetic trouble in the respiratory tract. The development of such trouble is probably determined much more by the site of the operation than by the anæsthetic agents or lack of skill in their employment. At the Royal Society of Medicine on Nov. 5, Squadron-Leader B. G. B. Lucas gave figures showing the prevalence of chest complications after operations for hernia on men in the RAF. Every operation which damages the abdominal wall is liable to be followed by such complications, because the pain caused at the site of the wound by a cough induces the patient to avoid coughing and deep breathing. The diaphragm, too, is often inhibited on the damaged side. Secretions collecting in the air-passages are thus not dislodged. The ensuing complications may take the form of lobular atelectasis, sometimes of lobar atelectasis—which is of greater import—and sometimes of frank bronchitis. Many of the patients simply had coughs after operation with no physical signs or rise of temperature. In most patients trouble was slight and over in a few days, but in the worst series 14% of the patients had severe trouble. A great variety of anæsthetic methods were tried in order to see whether the anæsthetic could be incriminated. The number of patients with subsequent chest trouble remained about the same, whether regional analgesia with or without chloral, 'Pentothal' alone or pentothal with gas and oxygen, or gas and oxygen and ether was employed. It is noteworthy that a large number of patients had a cough before operation, generally attributable to smoking. One speaker at the meeting brought forward evidence that smokers suffered much more often than non-smokers from respiratory trouble after operation. The most effective treatment, according to a consensus of opinion at the meeting, is to be found in breathing exercises begun before operation and carried out systematically for some days afterwards. Being mechanical in origin the condition can be prevented mechanically.

THE COPLEY MEDALLIST

THERE is a paradox about the first breath as there is about the maiden voyage of a steamship. Behind the initiation of the vessel's functional life is a background of trial trips, assemblage of parts, fitting of machinery and all that. Sir JOSEPH BARCROFT has shown that the movements responsible for the first breath have a history that can be traced back to the very first efforts of which the fœtus was capable. The captain and the accoucheur have been too deeply engrossed in the safety of their precious charge to observe and experiment. The Copley medal has been won by the physiologist who has within a period of five years filled an age-long gap in our knowledge of the act of birth. The achievement was not simply a flash of insight but the sequel of life-long inquiry—here, there and everywhere—into the mechanics of respiration, and conveyed with the inimitable descriptive faculty of one fortunate to draw his own first breath in co. Down.

"... When a man is taken to a certain hospital in the East End of London with a broken leg the hospital telephones to his employer saying that he will be fit for work in such and such a time, and asks if his place will be kept open for him. The employer says 'Yes' and the man is told at once. His mind is at peace, and since this has been done there have been no cases of traumatic neurasthenia at this hospital."—Lord MORAN, in a letter to the *Times* of Nov. 3.

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Special Articles

THE PHYSIOLOGICAL ANATOMY OF HEALTH CENTRES

So far, relatively little thought has been given to the design of health centres. In hospital planning structure must of course be determined by function, and the same must apply to other buildings used for health purposes. The external and internal architectural treatment are likely to have some psychological significance both for the public who will have to adapt themselves to the new conception of group practice, and for the staff of the centre, whose work must to some extent be modified by the milieu in which it is done.

A number of examples of health centres to house municipal health services already exist. Bristol has been a pioneer in this respect; in the last seven years, one main and four branch centres have been built; their weekly attendance is about 10,000, and the main centre is already too small. Two of the centres at least provide radiological facilities available to the general practitioners of the city. The Finsbury borough health centre is small but attractive; an original and popular feature is a clinic for foot ailments. Another small municipal centre is that of Darwen, opened in November, 1942. This centre is situated within easy access of any part of the borough, and the premises are well built and suitable for clinical work; but experience has already shown one or two slight defects which may serve as a warning to other designers. Public health and sanitary services, child welfare, antenatal and postnatal clinics, school medical services and such subsidiary services as orthopædic and school dental clinics, speech therapy, child guidance and diphtheria immunisation are all housed in or operated from the centre. Since it was established the public have made fuller use of the health services. Proposals for a series of main and subsidiary centres in Manchester were described in a recent issue,[1] and an impression of one of these main centres may now be added (fig. 1).

These municipal centres give only limited guidance when proposals for general practitioner health centres are considered. An attempt to meet this specific need has been provided by the Medical Practitioners Union.[2] It was disappointing to see the factory-like elevation of their proposed building, and the rows of seats in the diminutive waiting-rooms reminiscent of the poorer type of lock-up surgery. Moreover there is a danger that if it is left alone in the field this type of centre might be adopted in principle by the Ministry of Health, and model plans based on inadequate proposals might be issued to local authorities. Much more stimulating are the designs of Lionel Pearson, FRIBA. A careful study of Mr. Pearson's plan (figs. 2 and 3) shows that function has determined structure at every stage; and the result is a building of real charm.

CHOOSING THE SITE

The needs are: adequate lines of communication for the patients and staff; reasonable quiet; and adequate space.

The patients attending a health centre are going to be drawn from an area considerably more extensive than that covered by the average doctor's surgery. Having decided the area—the margin of which cannot be absolutely precise since choice of doctor, and hence of centre, is to be at the patient's discretion—it will be necessary to study carefully a map showing:—

1. Density of population, and location of dwellings.
2. Public transport services (frequency of running should be known).
3. Natural foci of community life such as shopping centres, cinemas, schools, public libraries, and municipal offices.

Sites having suggested themselves, possibly adjacent to or behind shopping centres, it will then be useful to check how long it will take residents at a dozen places on the periphery of the area to reach each site. Sites should be near, but set well back from, main roads. Medical officers of health might do well to select a few possible sites in advance, and discuss them with the town planning officers of their authorities, particularly where air-raids have done substantial damage.

EXTERNAL NEEDS

There must be a covered parking place for prams, push-chairs, bicycles and invalid chairs, immediately adjacent to the main entrance. Since most of the medical staff will probably come and go by car, there should be a covered parking place for the doctors' cars, wide enough to allow any car to leave without displacing the others. It is anticipated that at least one assistant doctor will be resident at the centre, and he may be called out to visit patients in their homes; further, it may be convenient for the doctor on night duty to leave his car at the centre; so at least two lock-up garages should be provided. Patients may have to be removed by ambulance, and it will avoid gaping sight-seers if a back approach for ambulances and lorries is provided.

An open-air playground will be needed—particularly where children's clinics are held. A part of this might be roofed in as in Mr. Pearson's plan. Finally a garden for the resident and other staff would be welcome.

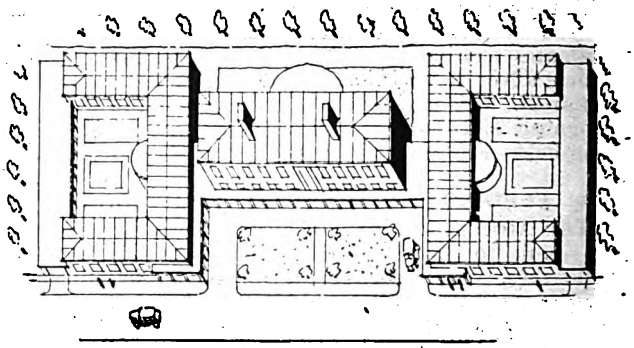

Fig. 2—Design for a family health centre by Lionel Pearson, FRIBA.

INTERNAL NEEDS

Since the essence of the centre is preservation of the doctor-patient relationship the main entrance should be the entrance for everyone. The day when patients were passed round the side, like tradesmen, must surely be over.

Mr. Pearson has divided his centre into three sections: a central one with the common services, a left-hand section containing the general-practice department, and a right-hand section for clinics and dentistry. In principle this seems a sound arrangement.

On entering, the patient's first port of call must be the registry. Here he would be issued with a card giving an appointment number, and the clerk would immediately send his records through to the doctor's consulting-room. The circulation in Mr. Pearson's plan might be eased by reversing the position of the clerical registry and the X-ray room. The registry should include not only a record room, an appointments register, and a typing pool, but also a room for one or more social workers.

The patient, with card, will now go to the main waiting-room. This should be reasonably large, comfortably furnished, and cheerfully decorated. It should have a lavatory for each sex adjacent. Each doctor would signal for his next patient by pressing a numbered button on his desk, when a soft buzzer would sound in the waiting-room and the number on the patient's card would be illuminated beneath the doctor's name.

It is assumed that doctors will collect and examine specimens in their consulting-rooms. The microscopic examination of urine in particular should certainly not be delegated to anyone else. Blood for tests will also be taken in consulting-rooms, though blood-counts and other investigation will be done in a common laboratory. Each consulting-room should have a weighing machine, an X-ray viewing screen, a built-in sphygmomanometer, over the couch, and a good blind for darkening the room for ophthalmoscopic examinations. In the patient's note-file will be a treatment and certificate card, on which the doctor will write his prescription, adding his

1. *Lancet*, 1943, ii, 490. 2. *Ibid*, 1943, ii, 365.

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initials in columns marked for the appropriate certificates—a process taking perhaps 30 seconds. The patient, having been instructed about when to report again, will then leave with his treatment card and go to the dispensary. While medicine is being prepared, he will sit in the waiting-room, and when it is ready he will take the treatment card to the social worker who will issue him with the appropriate certificates, stamping them with the doctor's signature. Any special points the doctor wishes the social worker to take up will also be noted on the treatment card, which will then be returned to the record department. All the patients' notes will be collected at the end of the session. All rooms should be linked by an internal automatic telephone, so that, for example, any doctor who wishes to call in a colleague to see an interesting or difficult case may easily do so.

In addition to a small clinical laboratory, the general-practice section should contain two surgeries—one for clean cases and plaster work, and one for infected cases—with a surgical waiting-room (equipped with simple resuscitation apparatus for accidents), a common anæsthetising room, and two recovery rooms.

The section for clinics and dentistry might again well centre round a large waiting-room—or better two waiting-rooms, since those with toothache are hardly likely to welcome infants also waiting. The clinic waiting-room should have adequate lavatory accommodation, including special accommodation for children, close at hand. The doctors' examination rooms—there should be at least two—should open out of nurses rooms where babies can be weighed and mothers prepared for examination. There should be rooms for the treatment of dirty children and minor ailments; and one or two rooms where domiciliary midwives can keep their records, and store and sterilise their instruments. The dental section might include a special extraction room, a mechanic's room, and a dental nurses room, in addition to the dentists consulting-rooms.

In the central block, Mr. Pearson includes a large lecture room, an X-ray department, and an electrotherapeutic and massage department. It is suggested that the central block should have three floors. The first should be devoted to common staff-rooms, while the top floor should provide two flats for the assistant general practitioners, and a third flat for a resident caretaker. On the first floor there should be a common canteen for all the staff—doctors, dentists, nurses, social workers, clerks, and technicians—on the cafeteria system, with the necessary kitchen and scullery. There should also be a small committee room, a large common smoking-sitting room, and a library—though this might be combined with the committee room.

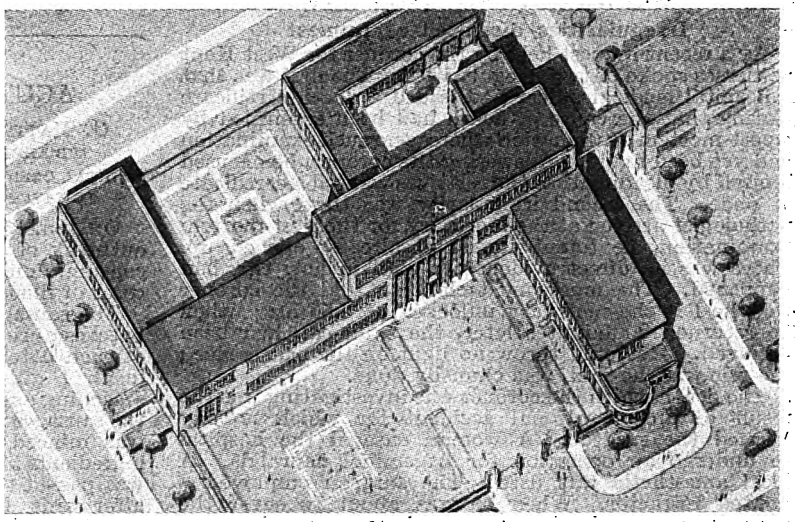

Fig. 1—Design for a municipal health centre by G. Noel Hill, FRIBA, MTPI, taken from a report on health centres presented to the Manchester Public Health Committee on Sept. 16, 1943, by the Medical Officer of Health.

THE COUNTRY DOCTOR

In rural areas, the ideal plan would be to combine the necessary facilities for health work in each village with other social service needs, to produce a village community centre. The district nurse's room, the doctor's surgery—visited, say, twice a week for general clinics and once a week for maternity and child welfare clinics—and a small dispensary, might open out of a waiting-room which on other occasions became the village hall. In addition, under the same roof there might be a British Restaurant and school canteen, the village library, a young people's club-room, and a committee-room.

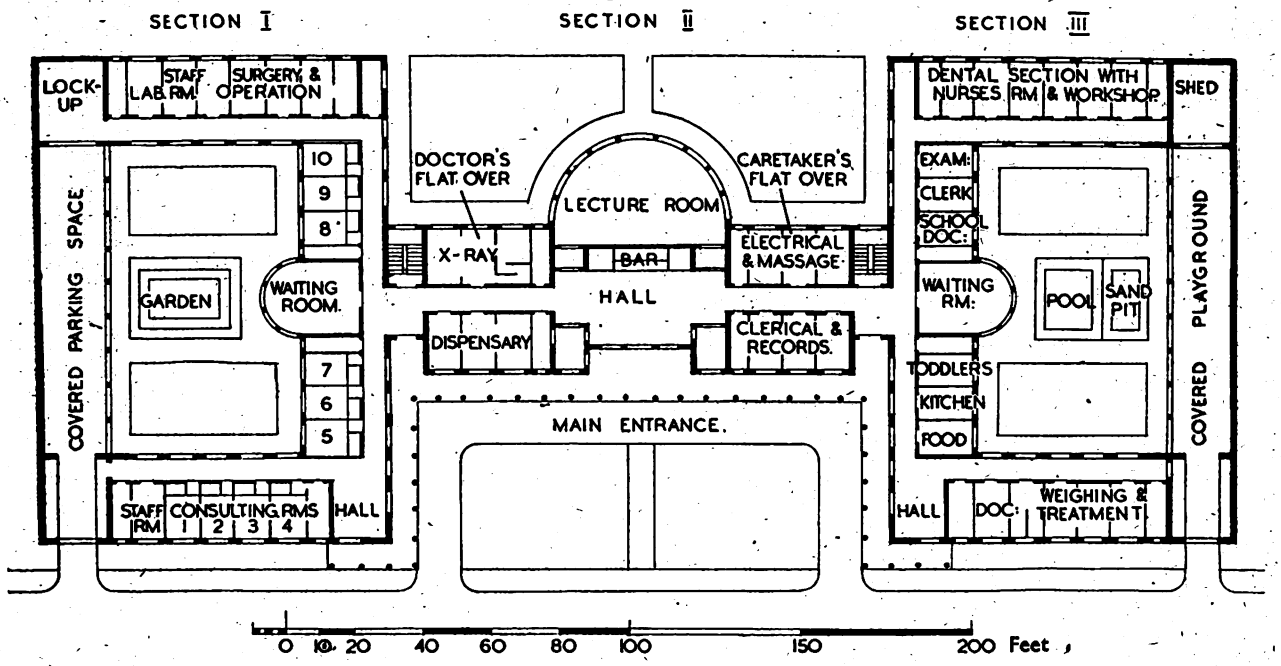

Fig. 3—Layout plan of the centre shown in fig. 2. Section I: General practitioners' consulting-rooms with coöperating medical services. Section II: lecture room and special departments. Section III: maternity and child welfare, school and dental clinics. Figs. 2 and 3 appeared in *Architectural Design and Construction* 1943, 13, 61, and are reproduced by kind permission of the Editors and Mr. Pearson.

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MEDICINE AND THE LAW

Irregularities disclosed at Inquest

AT a recent inquest held by the coroner for West Kent witnesses spoke of two irregularities. The first was that a hospital medical officer had issued a death certificate stating that the cause of death had been confirmed by a post-mortem examination whereas no such examination had yet been made. Answering the coroner, he excused himself by pleading that the relatives wanted a certificate at once. The second irregularity was that, when the pathologist arrived at the mortuary for the post-mortem examination, he found the skull already opened up. There was no direct evidence to explain how this had happened. The mortuary technician told the coroner that he left the mortuary unlocked at 9.55 AM; when he returned 20 minutes later, the skull cap had been removed. He could throw no light on the occurrence; the removal, he said, was clumsily done.

The death which the coroner was investigating was the result of an operational accident for which nobody blamed the surgeon. A woman entered the hospital to undergo an operation for trigeminal neuralgia. A local anæsthetic was used. The surgeon employed a lighted retractor. When he was about to sever the nerve, a nurse who had patted the patient's hand to reassure her, reported that she felt an electric shock; feeling faint, she was told to switch off the current and leave the theatre till she recovered. The surgeon could hardly pause to ascertain the source of the nurse's shock; the fact that the retractor bulb had not burned out seemed to negative the passage of abnormal current down the machine. Suddenly the patient went into an epileptic fit; hæmorrhage began and had to be arrested; the operation was not completed; the patient was taken back to the ward where she died. There was evidence at the inquest of previous complaints of the electric transformer, surgeons having received minor shocks. The apparatus had been sent away to be overhauled; the trouble on this occasion, according to an electrical engineer, was a short circuit.

The jury, while absolving the surgeon from all blame, criticised the unsatisfactory service of the electrical apparatus, the issue of a false death certificate, and the lack of supervision at the mortuary. The coroner commented on the delay in notifying a death at a hospital when an inquest seemed necessary. Bereaved relatives, he observed, were sometimes told at a hospital that no inquest or post-mortem examination would take place; the authority of the coroner was thereby usurped. The result was that relatives made arrangements with undertakers for the funeral and then were greatly distressed if the coroner had to intervene. He suggested that he should be notified within 12 hours of the death of a mental patient and within 24 hours of other deaths which required investigation. If this were done, the family's distress to which he had referred would be avoided.

Infectious Disease in England and Wales

WEEK ENDED OCT. 30

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 3623; whooping-cough, 1693; diphtheria, 702; paratyphoid, 5; typhoid, 7; measles (excluding rubella), 585; pneumonia (primary or influenzal) 576; puerperal pyrexia, 196; cerebrospinal fever, 26; poliomyelitis, 13; polio-encephalitis, 1; encephalitis lethargica, 0; dysentery, 248; ophthalmia neonatorum, 75. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Oct. 20 was 1978. During the previous week the following cases were admitted: scarlet fever, 206; diphtheria, 53; measles, 11; whooping-cough, 44.

Deaths.—In 126 great towns there were 2 (0) deaths from enteric fevers, 2 (1) from measles, 1 (1) from scarlet fever, 3 (2) from whooping-cough, 21 (1) from diphtheria, 55 (4) from diarrhœa and enteritis under two years, and 25 (4) from influenza. The figures in parentheses are those for London itself.

Wakefield and Cambridge each reported 1 fatal case of enteric fever. Birmingham had 6 deaths from influenza. There were 8 fatal cases of diarrhœa at Liverpool.

The number of stillbirths notified during the week was 208 (corresponding to a rate of 34 per thousand total births), including 20 in London.

Public Health

OUTBREAK OF ACUTE ARSENICAL POISONING

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MB ABERD, DPH
MEDICAL OFFICER OF HEALTH FOR FIFE COUNTY

B. W. ANDERSON
MD ST. AND, DPH
DEPUTY MEDICAL OFFICER OF HEALTH FOR FIFE COUNTY

ON Jan. 15 and 16, 1943, in St. Andrews, there was an outbreak of acute arsenical poisoning following on the consumption of sausages and resulting in at least 150 cases of illness and 2 deaths.

The sausages were made in a butcher's shop in three batches during the forenoon of Jan. 15. The ingredients of each batch were: 10 lb. meat and fat, 15 lb. biscuit meal, ¼ gill sulphur dioxide preservative, 1 lb. pork seasoning and 10–12 pints water. The duty of preparing the sausages was shared between 3 assistants. The meat was minced and subsequently mixed with the other ingredients in a large galvanised iron bath. The mixture was passed through the mincer and more than half was afterwards fed into a sausage-making machine, the remainder being retained for sale as sausage meat. None of the workers in the shop would admit to any departure from this procedure, addition of another ingredient or to the possibility of interference by another person.

COURSE OF ILLNESS

The three batches were sold as sausage meat and as sausages to the general public and to a students' hostel. Symptoms followed rapidly after consumption. The first cases occurred in the students' hostel where sausages from the third batch were eaten at lunch. Approximately 90 men were affected. The illness was fairly severe while it lasted but only one man sought medical attention. Later in the same day and on the following day cases of acute illness occurred throughout the town and subsequent investigation showed that only those who had eaten this foodstuff were affected. Those who partook of the first batch manufactured reacted more severely than those who ate from the second and third batches. Medical advice was sought in many cases and the attention of the public health department was directed to the occurrence on the afternoon of Jan. 16.

Most of the patients experienced epigastric discomfort within a few minutes of eating the food and most cases vomited violently 5–15 minutes later. Some patients felt discomfort before they had finished eating their portion and left the remainder uneaten. No one noted anything unusual about the taste of the sausages. Dogs which were given discarded portions consumed them and were sick. Cats declined to eat them but this may have been due to the pepper which formed part of the seasoning.

In some cases the vomiting continued for more than 8 hours. Diarrhœa developed in most cases some 3–6 hours after the onset of vomiting, but its severity was much less than that of the vomiting: some cases had no diarrhœa. Patients were left in a state of exhaustion or collapse, all of them suffering from varying degrees of dehydration. The period of illness lasted in mild cases for 3–4 days, in severe cases up to 6 weeks.

CASE 1.—A man, aged 52, consumed for breakfast on Jan. 16 4 sausages containing, it was subsequently found, a total of gr. 45 of white arsenic. He experienced immediate abdominal discomfort and pain but did not vomit until two hours later. Vomiting was then severe and later was accompanied by diarrhœa. He became collapsed and dehydrated, and although towards evening his condition improved, he relapsed and died in the early hours of Jan. 17, some 17 hours after eating the sausages. He was obese and not in the best physical condition.

CASE 2.—A woman, aged 48, ate for breakfast on Jan. 17 3 sausages purchased from the same batch. Half an hour later she began to vomit and continued to do so for 6 hours, for the latter half of which period she also had diarrhœa. She became extremely collapsed and showed much evidence of dehydration. She died 12 hours after ingestion.

The main findings on post-mortem examination were identical. The stomach was congested, greatly distended with

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gas and contained fluid. The congestion and distension continued throughout the length of the duodenum and gradually lessened in the course of the jejunum. The ileum was not distended but was slightly hyperæmic. In the male the large intestine was normal in size and in appearance; in the female it was contracted and pale. The mucous membrane of the stomach, duodenum and jejunum showed acute inflammatory changes. The only other abnormalities found were of long standing. In the female there were extensive old pleural adhesions and in the male fatty infiltration of the liver, a heavy deposit of fatty tissue on the heart wall and one or two small nodules and points of thickening on the aortic valve.

INVESTIGATION

Although symptoms pointed more to an irritant poison as the cause of the outbreak, specimens of sausage-meat, of stomach and bowel contents, and of abdominal organs were submitted as a routine for bacteriological examination. The bacteriologist's report showed that while a few staphylococci were present in the sausage-meat, they were insufficient in number to account for the development of an enterotoxin. Cultural examination failed to display in any specimen the presence of any micro-organisms of the salmonella or dysentery groups.

On specimens of sausages and sausage-meat sent for chemical examination the analyst reported as follows:

First batch.—Three samples of sausages analysed contained 98, 99·4 and 102·4 grains of white arsenic per lb. (The first and third of these samples were part of the lots actually eaten by the 2 persons who died.)

Second batch.—The sausage-meat contained gr. 9·54 per lb.

Third batch.—The sausages contained gr. 4·16 per lb.

The arsenic was present in each sample in the form of arsenious oxide (As_2O_3) and the relative quantities indicated that the arsenic was added to the first batch only and that successive batches were affected by the residues carried over from one making to the next. A sample collected from a fourth batch manufactured on the morning of Jan. 16 contained only gr. 7/125 arsenic per lb. Only one family made purchase from this batch and consumed the meat with no adverse effect.

Assuming this method of introduction to be correct, since the weight of a batch of sausage-meat was between 35 and 40 lb. approximately one-half pound of pure white arsenic had been added to the first batch of sausage-meat. The first batch was sold to the general public and, as has been stated, the cases of illness so produced were much more severe than those in the students' hostel to which parts of the second and third batches had been sent, or among 3 of the shop employees who also partook of the later batches.

Arsenious oxide was found present in the stomach and bowel contents and in the abdominal viscera of the 2 fatal cases in quantities sufficient to cause death.

Chemical analysis was made of all the materials used in the making of the sausages—seasoning, preservative, biscuit meal, salt and skins, and also of the contents of all packages, tins, bottles, bags, &c., found in the shop. No trace of arsenic was found in any. Examination of dust from the pockets of the workers gave negative results. The butcher-meat from which the sausage-meat was made was cut from a large portion of a carcase which was otherwise consumed by the public without injurious effect.

On April 27—101 days after consumption of sausage-meat—specimens of urine, fæces and hair were obtained from 2 men who had been ill. These were sent for analysis. The specimens of fæces contained 0·2 and 0·5 parts As_2O_3 per million respectively while the urine contained 0·05 and 0·15 parts per million. No arsenic was present in the hair. Neither of the two men had in the interval been taking any preparation containing arsenic.

After it had been established that the cause of the outbreak was not of bacterial origin, investigation was continued by the police but no evidence was found as to how the arsenic was added to the sausage-meat, or as to its source. All local purchases of arsenic from chemist shops and other premises were checked. Sales by wholesalers over a wide area were investigated. Stocks in local laboratories were found to be intact. It is to be presumed, therefore, that the white arsenic used was purchased some considerable time ago by some person unknown.

DISCUSSION

The fact that the arsenic was present as pure arsenious oxide probably excludes purchase from sellers of poisons listed in part II of the poisons list (Poisons List Confirmation Order, 1935). If the arsenic was purchased, it is more likely to have been bought from a retail or wholesale chemist or obtained from a manufacturing firm. The poisons rules are so framed that a private person can purchase white arsenic only if:

(*a*) he is known to the seller as a person to whom this poison may properly be sold or is certified in writing by a responsible person known to the seller to be a person to whom the poison may properly be sold; and

(*b*) he signs the poisons register and indicates the purpose for which the poison is to be used.

An improper sale under such conditions can hardly be envisaged in these days. Further, the sale of certain arsenical compounds (and these include the oxides) is prohibited if these are intended for use in agriculture or horticulture, for the destruction of bacteria, fungi, insects, vermin or weeds, unless there has been added a dye of distinctive colour and soluble in water (Poisons Colouring Rule, 1936). These provisions restrict the sale of white arsenic, but a great responsibility rests on the seller since he has to be satisfied not only as to the person receiving the arsenic but as to the purpose for which it is to be used.

Although none of the chemists' shops visited held larger quantities of arsenious oxide than 2 oz., investigation did reveal an alarming fact—namely, that a rat-catcher, living in an adjacent county, had purchased no less than 80 lb. of pure arsenic in the course of the last 2 years. This arsenic was bought in 10 lb. lots from a retail chemist and it was not coloured.

Again, while the rules concerning the retail sale of arsenic are reasonably strict, they do not apply to wholesale dealings or to the sale by wholesalers or manufacturers to persons who regularly use arsenic in the manufacture of other articles. If white arsenic be required for the purpose of a trade, business or profession, an order has to be signed specifying inter alia the purpose for which the arsenic is required, and here again the seller has to be "reasonably satisfied" as to the propriety of the proposed purchase.

There is, therefore, an unexpected number of persons who can purchase, or who have access to, white arsenic. Furthermore, while the rules governing storage apply to types of containers, transport and storage in retail shops and institutions, they do not apply to storage after purchase so that there is always the possibility of arsenic getting into the hands of unauthorised persons. As an example, one might instance the ease with which arsenic could be removed from a laboratory. If it is not practicable to strengthen the Act governing the sale of poisons, all buyers should be seriously warned that arsenic should be used only for the purpose declared at the time of buying and they should be obliged so to store the poison that there is no possibility of it being used in error for some other purpose or of it falling into the hands of any person unauthorised to possess it. At the same time, steps should be taken specially to stress the great responsibility which rests with persons selling arsenical compounds to see that they get into the hands only of persons who have a proper use for them.

SUMMARY

An outbreak of acute arsenical poisoning due to consumption of contaminated sausage-meat is described, involving at least 150 cases of illness and 2 deaths.

Arsenious oxide in pure form was recovered from the sausage-meat in amounts ranging from gr. 7/125 to gr. 102·4 per lb.

The source of the arsenic was not traced.

Traces of arsenic were still present in the fæces and urine of patients 101 days after consumption.

It is suggested that steps be taken to provide further safeguards in the sale and storage of arsenic.

ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION.—At 10.30 AM on Wednesday, Nov. 24, at 1, Wimpole Street, W.1, there is to be a discussion on postwar psychiatry, continued at 2 PM.

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In England Now

A Running Commentary by Peripatetic Correspondents

SOME enterprising publisher might do much good, though he wouldn't make much money, by producing a hospital phrase-book. In our medical ward at the moment is a wretched Italian prisoner with some obscure kind of jaundice which makes him feel very ill and needs a lot of investigating. He can speak no English and none of the medical or nursing staff has a word of Italian. The difficulties involved in his treatment, and particularly in his nursing, can well be imagined. There must be many foreigners with no more than a rudimentary knowledge of English in British hospitals here and abroad just now, and our responsibilities in this direction are likely to get steadily heavier. What is needed is either a single phrase-book covering the likely languages—French, German, Italian, and perhaps some central European and Scandinavian tongues—or a series of phrase-books covering one language each. The phrases would include the essential questions which the doctor or nurse may want to ask, and the explanations of treatment or routine they may have to make; and, from the patient's point of view, symptoms, likely requests and so on. A committee including an experienced ward sister or two could without much trouble draw up a list of phrases which would be an immense help though it could not cover every eventuality.

* * *

Dear opponents-of-nursery-schools, have you ever watched a mother entertaining her little one on board a Clyde steamer? This is how it goes:—

"Maw, what kind o' a ship is this?"
"Sit doon an' haud yer wheesht." (pause)
"Maw," as he points to the lovely range of Arran peaks, "what hills is these?"
"A dinna ken; sit still." (interval)
"Maw, what's a submarine like?"
"Here's a sweetie, an' shut up." (long pause)
"O maw, come an' see this big ship."
"Come aff they railings or I'll skelp yer backside."

This apparent severity is not really vicious; it is simply due to lack of training. Many of these mothers have no stories to tell to children and are devoid-of any means of interesting them. In consequence they divide their time between useless scolding and an equally senseless coddling. The child of this type is generally master of the household and he knows it. His whims determine the food that is eaten and rejected and the whole family revolves round him. The serious question is, how do these half-pampered, half-bullied children look when they are grown up?

I can't pretend to give a studied answer; but my friend M was in a crowded train near Stirling the other day when two women holding babies had to stand beside him in the compartment while a boy of sixteen or so sprawled across a corner seat in luxurious ease, smoking a cigarette and reading a book entitled *The Boy Racketeer*. Perhaps the clue lies there. The girls are much the same: in my hospital we often get probationers who on their own confession have never made a bed or a semolina pudding. "O, mother always did that!" Then I am moved to think of Weir of Hermiston, who knew something of the world: "Gie me a lassie that can plain boil a potato, and I don't care if she be a whure off the streets."

* * *

This morning one of my patients knocked the conceit out of me in no uncertain manner. He was an elderly man from whom I had removed a gangrenous appendix four days previously, and he had made an uneventful recovery. "I've made a wonderful recovery, haven't I, doctor?" was his sighting shot, to which I readily agreed. Then, "In fact I've recovered far more rapidly than you at first anticipated." It was obviously up to me to fall in with this perfectly true suggestion but his face lit up as he saw my guard lowered and my chin exposed for his knockout. "I can now let you into my little secret. As soon as my doctor told me that I had to have an operation and that you were coming to do it I realised that my condition was pretty desperate. I sent immediately a cable to an old friend, a faith healer, now in Hobart, Tasmania, telling him of my plight. He replied at once 'I am treating you. Don't worry.' Surely your admission that I got on more quickly than you expected proves that my friend's treatment has been successful." I did my best by murmuring humbly, "All the same I did remove your appendix." Quick as lightning he came back at me, "Yes, but my friend was there in spirit to aid your decisions and to guide your hand." What more was there to say? I took the count.

* * *

One of your correspondent's notes about illegible prescriptions started a conversation about some other vagaries of prescribers. One of the circle told us he made a hobby of collecting unusual and curious prescriptions and he had just acquired a new specimen. It read:

℞ Antim. pot. tart. BP	..	·0083% w/v
Ammon. acet.	..	1·8%
Tinct. opii BP	..	·234% v/v
Acid benzoic.	..	·0234%
Camphor	..	·0140%
Ol. anisi	..	·0140%
Ethyl nitrite	..	·12%
Spt. vini rect.	..	3·78%
Glycerin	..	3·125%
Trichloromethane	..	·125%
Tinct. senegæ	..	1·561%
Aqua ad.	..	100%

Mitte 20 oz.

"Were I a pharmacist faced with this," he said, "I would feel like beating my head against the wall. And if it appeared as a NHI script for which I was to receive 5*d*. as dispensing fee, my blood-pressure would rise dangerously." There was general agreement, but another pointed out it had all the appearance of being some proprietary which the doctor did not wish to prescribe by name, and knew the pharmacist would recognise; and so long as the pharmacist knew what it was he could dispense the ready-made mixture. Still if he didn't know it heaven help him! "But why on earth," I asked, "didn't the doctor prescribe the proprietary cough-stuff by name? He couldn't have thought he wasn't allowed to; or could he?"

* * *

An end to all this arrant nonsense about the glorious liberties of medicine as it is practised at the moment! The would-be consultant now has to stoop to all sorts of intellectually humiliating devices such as coaching (the prostitution of intelligence), performing hack work for "coaching colleges," or lecturing on anatomy or physiology at nights in obscure suburban technical colleges. In the intervals of such work he "devils" as no young barrister would ever be expected to in various hospitals, doing the greater part of the work of the hospital without any emolument in order that the honoraries may spend more of their time trying to collect the wherewithal to pay for the absurd standard of living set up by "Harley Street," and the hospital can pretend to pay its way. How can we expect young men trained in such a school to have any respect for the Hippocratic ideals? How could state medicine ever produce conditions more inimical to the mental and moral development of the so-called leaders of the profession? In general practice the same outlook prevails—what member of the profession is honestly capable of dealing with a waiting-roomful of 40 patients in two hours? Even the most experienced of consultants find that ¼ hour is the minimum time in which he can cope with one patient. How can the GP, who has been up all night attending one or more confinements, possibly do justice to a full day's programme next day?

I am no advocate of state medicine, but honesty compels me to wonder whether an efficiently run state system of medicine could possibly be worse than the present one.

* * *

The changing of the Guard at Buckingham Palace seems less impressive than it used to be, partly, no doubt, because one has grown more critical with the years and partly because khaki (especially battle-dress) has less æsthetic appeal than full-dress. The slow marching, however, is still almost up to Tattoo standard and the dressing and steadiness on parade leave nothing to be desired. I was a little shocked the other day to notice a corporal carrying his rifle at the slope with a downward slant of his forearm. That would never have done for my old chief, the Duke of Wellington. Or do I mean Earl Haig? It is hard to remember, it was all so long ago.

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Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

AT the end of the first world war the chief problem was one of employment; at the end of this war the main problem, and this time a world problem, will be food. The debate on the Indian food situation, the famine in Bengal and near famine in other provinces, threw a grey light on this problem which reveals no place for optimism. The debate was opened by Mr. Pethick-Lawrence, who firmly fixed the responsibility for major decisions on the House of Commons. "We are all Members for India," he said; "the main cause of the famine is that there are large numbers of people in certain provinces in India who have not the purchasing power to enable them to buy such food grain as will keep them alive." Prices have risen steeply, the general index about 300%, the price of consumer goods such as cotton and kerosene which the peasant wants to buy by some 400–500%, of food grains by about 500–700%, and of certain commodities by as much as 900%. This is grave inflation, and Mr. Pethick-Lawrence said there was no mystery as to what had caused it. "It is the spending of huge sums in India by the Government of India and by the British Government and the printing of paper money in order to pay wages and the rise in the costs of production without drawing off purchasing power from individuals in taxes, in genuine loans and in other ways." He went on to speak of the ineffective efforts of the Government of India to control prices and said that you cannot control prices unless you prevent inflation. To which you must add rationing and possibly subsidies for food production as in this country. At the 1943 harvest there was an actual shortage of grain crops and there had also been an actual export of food grains from India which must be stopped.

The Secretary of State for India rose at once after Mr. Pethick-Lawrence sat down and said of his speech, "I do not think I differed from him on a single point" of his analysis of the situation. But, Mr. Amery added, the problem is one of even wider dimensions. Lord Woolton had warned us that we are running into a world shortage of food. Mr. Wallace, vice-president of the United States, had said that food will be the dominating problem of 1944. "The output" [of food], said the Secretary of State, "will not begin to meet the overwhelming demand for 1945, and the proper organisation to meet the coming world food crisis beforehand is a question of life and death for millions."

The most damaging criticism of the Government's attitude came from Sir George Schuster, who was formerly finance member of the Viceroy's Council in India and whose recent book on India is accepted as an objective and authoritative discussion of today's problems in that sub-continent. In general, Sir George agreed with Mr. Pethick-Lawrence and Mr. Amery as to diagnosis but stressed that on his reading of the matter "the two main contributory factors to the trouble have been, first, the meekness and vacillation of the Government of India, and secondly their total failure to devise and apply a sound financial policy." On the two crucial points in the story, how to handle food problems and financial policy, Mr. Amery and the India Office in London should have been able to give more advice and guidance to the Government of India, and "the responsibility which rests in London has not been fully discharged." This brought Sir George to the final stage in the ascending steps of responsibility, the House of Commons, for, as he pointed out, it is expressly laid down in the 1935 Act that it is Parliament "upon whom responsibility lies for the welfare and advancement of the Indian people." Sir John Anderson, now Chancellor of the Exchequer and a former governor of Bengal, replied to the debate (or rather buffered it) but said that he believed we had reached the peak of inflation—which may or may not be over optimistic.

But this Indian situation, grave in itself as affecting 390 millions of people, is only an example of conditions much more widespread in the world than our own guarded, ordered and controlled war-time lives. Outside Great Britain, the Dominions and the Colonies there are vast areas of inflation and food shortage. What the conditions will be in Europe when Hitler is finally defeated is difficult to prognosticate. What is certain is that hunger and disease will present governments, and especially the health ministries and the medical profession, with a greater task than any they have hitherto been asked to undertake.

QUESTION TIME

Domestic Staff for Hospitals

Mr. ERNEST BEVIN, Minister of Labour, in a statement made in the House of Commons on Nov. 4, said he had been giving careful consideration to the proper organisation and supply of domestic staff in time of war to institutions caring for the sick, the aged and infirm and young children, the school meals service, and similar organisations. He found that there was a lack in a great part of this field of any recognised rates of pay or conditions without which effective action on a large scale was extremely difficult. He therefore appointed at the end of July a committee, under the chairmanship of Sir Hector Hetherington, to advise him as to the rates of pay and other conditions of employment. The report of that committee had been received. He proposed to accept its recommendations on the clear understanding that the charges or deductions for meals should be a matter for arrangement between the employing body and the employees or their representatives, subject to the provision that the charges or deductions for full and adequate meals should in no case exceed those specified in the report and that working clothing, where required, would be regarded as a charge on the employing body. For the first time he would have a firm basis on which to work, and where these conditions were fulfilled he would deal with recruitment to this work in exactly the same way as to any other form of important national service, whether in industry or the Services, according to the priority allotted to it and including the use, as necessary, of his powers under Defence Regulations.

He did not propose to rest content with promulgating rates and conditions for adoption by individual institutions. It was his aim that this service should be placed in the general estimation on a footing with any other industry and that it should offer suitable training, prospects of advancement, and proper welfare arrangements. He was, therefore, appointing a small standing committee to advise him as to the further steps which should be taken from time to time in these and kindred matters, and so far as welfare was concerned, he intended to ask the Factory and Welfare Advisory Board to extend their scope and their membership to include welfare for domestic workers in institutions. He was also arranging that the welfare staff of his department, both at headquarters and in the regions, should include the welfare of these workers within their scope. Special courses of training for hospital cooks were already available, and he would seek the advice of the advisory committee as to the directions in which these could be extended. The further problem with which he was at present concerned related to the private household which was suffering undue hardship owing to sickness, childbirth, or other emergency. Plans for dealing with such cases were under consideration.

University Grants Committee

Mr. EDMUND HARVEY asked the Chancellor of the Exchequer how often the University Grants Committee had met during the last six months; and whether, in view of the urgency of the equipment of the universities to deal with the postwar situation, steps were being taken by the committee to formulate appropriate plans.—Sir J. ANDERSON replied: The reconstitution of the committee has been under consideration for some time and I hope shortly to announce the appointment to the committtee of a number of new members. Pending its reconstitution, meetings of the committee have not recently been held. The universities themselves have been studying the various problems which will face them after the war. The committee of vice-chancellors and principals have asked the University Grants Committee to undertake a review of these problems in order to form a considered estimate of the need for increased assistance from the Exchequer. This request will have to be considered as a matter of urgency by the reconstituted committee; meantime, the universities are being asked to formulate their postwar needs so far as they can be estimated in present circumstances.

Tuberculosis Allowances

Dr. E. SUMMERSKILL asked the Minister of Health whether he was satisfied that the allowances given to patients suffering from tuberculosis were adequate.—Mr. E. BROWN replied: The scales on which tuberculosis authorities are being reim-

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bursed by the Exchequer in paying maintenance allowances to tuberculosis patients are in my opinion adequate for the purpose in view.—Dr. SUMMERSKILL: Is not the Minister aware that the object of these allowances was to relieve the anxiety of the patients and to encourage them to undergo treatment, and that in view of the fact that the amount of the allowances in some areas is little different from the public-assistance rate, this purpose is not achieved?—Mr. BROWN: The primary purpose is to make it easier for persons suffering from pulmonary tuberculosis to receive treatment without deterrent anxiety. I believe that there is a widespread welcome for this development.

Mr. F. MESSER: Is the Minister aware that in point of fact some of the categories in the memorandum are actually receiving less than the public-assistance scale?—Mr. BROWN: The memorandum gives full information on the whole subject.

Dr. SUMMERSKILL asked the Minister why he was granting allowances to patients suffering from acute tuberculosis and withholding them from chronic and incurable cases.—Mr. BROWN replied: I would refer to the reply given on Oct. 28. Dr. SUMMERSKILL: Is the Minister aware that the treatment of the tuberculous in this respect is the most inhuman that can be devised, because the patient who is refused an allowance knows therefore that he is incurable?—Mr. BROWN: I do not agree with that. The problem put to me was an industrial one. I asked the Medical Research Council to set up a committee, which they did, under Lord Dawson. I got their report, and allowances were settled for the first time and we got 100% grant from the Exchqeuer on a war basis. The larger problem falls to be considered with the whole question of dependants' allowances for sick persons.

Mr. H. MCNEIL asked the Secretary of State for Scotland how many applications from tuberculous patients for treatment or dependants' allowances had been refused since the inception of the scheme on the grounds that the applicants were not suffering from acute pulmonary tuberculosis or were unlikely to be fit for work within an ascertainable period.—Mr. T. JOHNSTON: Returns from all Scottish local authorities except two show that at Oct. 15, as compared with 1503 applications granted, 594 had been refused on the grounds stated in the question.

Miniature Radiography in Scotland

Miniature radiography sets have been allocated to the corporations of Glasgow and Edinburgh and to the county council of Lanark. The Glasgow set has been delivered and the corporation are now arranging for the appointment and training of the team which will operate it. Difficulties of supply are however delaying deliveries of the other sets. (Mr. Johnston replying to Mr. McNeil.)

Mass Radiography Apparatus for Russia

In reply to a question Mr. BROWN said: An offer recently made on behalf of the Government to present to the Soviet government two of the mass radiography units now being manufactured in this country has been accepted. They are to be sent to Russia almost immediately, and I learn from the Soviet Ambassador that one is to go to Stalingrad and the other to Leningrad. Though our present resources of these machines are limited, I feel certain that the people of this country will wholeheartedly approve the sending of two of them for the benefit of the heroic people of Leningrad and Stalingrad.

Staff Pay in Scottish Voluntary Hospitals

Mr. MCNEIL asked the Secretary of State for Scotland if all Scottish voluntary hospitals were paying their staffs the increased scales recommended by the Taylor Committee.—Mr. JOHNSTON replied: I am informed by the Scottish branch of the British Hospitals Association that 77 of the 120 voluntary hospitals in Scotland have decided to adopt the Taylor scales. Information with regard to the remaining 43 hospitals is not yet available.

Medical Treatment of Prisoners of War

Mr. R. W. SORENSEN asked the Secretary of State for War the number of prisoners of war, recently returned from Germany, who received surgical attention in Germany as the result of wounds received during the war; how many were fitted with artificial limbs by the German authorities; and whether he had received a Report respecting the general surgical and medical treatment our soldiers received.—Sir JAMES GRIGG replied: Very few of these men were fitted with artificial limbs by the German authorities. Most of them had reasonably effective appliances improvised in camp workshops. In general there were few complaints from the prisoners about medical treatment, much of which was, however, carried out by British medical personnel.

Paper Supply for Scientific Books

Mr. HARVEY asked the Minister of Production whether, in view of the need for an increase in the supply of paper for books and especially for books of an educational and scientific character, he had now been able to make a larger allotment of paper for this purpose.—Mr. O. LYTTELTON replied: I have authorised an increase of 2½% of prewar consumption in the allocation to each publisher, and an addition to the reserve to meet special needs. As in the case of newspapers and periodicals, I shall expect the publishers to give special attention to the needs of the Services.

Health Conditions in Freetown

Major A. M. LYONS asked the Secretary of State for the Colonies whether he had had an opportunity of personally inquiring into the responsibility for the deplorable conditions of health, lack of fresh water, bad drainage and housing at Freetown; and whether he could give the House an assurance that he was satisfied that improvement had been effected and would be sustained until these serious shortcomings had been completely rectified.—Colonel O. STANLEY replied: The present unsatisfactory conditions at Freetown are primarily due to the enormous strain suddenly thrown upon the administration of Sierra Leone by the exigencies of war and the consequent great increase in its population. I am satisfied that the administration is doing its best to improve conditions as quickly as possible, but its efforts are very seriously hampered by acute shortage of skilled personnel and of essential materials, adequate supplies of which cannot be expected to be available for a long time to come.

Major LYONS: Can the Minister say whether the administration which allowed this shocking state of affairs has been strengthened in any way?—Colonel STANLEY: I do not think that it is fair to blame the administration for whatever may have been the conditions at the beginning of the war. The then existing system had to work under the then income of the colony, and an administration which has had to work under those handicaps cannot be blamed for the result. Fortunately we have now altered that principle and in future the House will be able to help where a colony cannot do the requisite thing.

DOMESTIC SERVICE IN HOSPITALS

THE Government have adopted the recommendations of the Hetherington committee on the wages and working conditions of domestic staff in hospitals. "If hospitals and other institutions are to attract and retain domestic staffs of the quality which they require," say the committee, "every effort should be made to provide suitable conditions of accommodation and leisure." Some 10,000 more domestic workers are still needed in hospitals, and it is hoped that enough volunteers will now come forward to meet the shortage without recourse to the Minister of Labour's powers of direction.

For mental hospitals in England and Wales the committee adhere to the agreements made between the Mental Hospitals Association and the workers' union. For all other hospitals and institutions, voluntary or municipal, the minimum wage-scales for non-resident staff will range from 27*s.* 6*d.* a week for a maid of 15–16 years, to £3 5*s.* for cooks; for residents from £26 to £100 a year. Presumably a training in dietetics will carry a bonus. A 96-hour fortnight is recommended for all categories, with no extra pay for Sundays and bank holidays but time and a quarter for overtime. After 6 months service the domestic worker will be entitled to an annual week's holiday with pay, and in case of illness to 3 weeks' full and 3 weeks' half-pay in the first year, 6 weeks' full and 6 weeks' half-pay in the second year, and 9 weeks' full and 9 weeks' half-pay in subsequent years, NHI benefit being deducted from sick pay. Resident staff will be allowed an additional 12*s.* 6*d.* a week during holidays and sickness. The committee urge the need for efficient canteens for non-resident staff and suggest a scale of charges for meals. The wage-scales and conditions of service, which are fully set out in a white-paper (Cmd. 6481. HMSO. 2*d.*), must be complied with by all hospitals applying to the Ministry of Labour for domestic workers. Hospitals will welcome the Minister's promise, reported in our Parliamentary columns, to deal with recruitment to this work in exactly the same way as to any other form of important national service.

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Letters to the Editor

OUTPATIENTS FIRST

SIR,—We are very glad to see in your leader of Oct. 30 reference to the need for improving the outpatient services at our large general hospitals. We warmly support your suggestion of a hostel and canteen for the use of the anxious relative, and for the outpatient who is undergoing X-ray or other treatment that does not necessitate the use of a fully nursed hospital bed. Considerable economy could, as you say, be effected. To the important reasons given in your leader pointing to the need for improvements, we would add the vital need in these days to avoid by every possible means the loss of working hours.

We regret, however, that separate outpatient blocks are postulated. Those who have studied this question carefully over a long period of years feel that quicker and more efficient investigation of the outpatient can be effected by close liaison with the medical, nursing and social welfare service available for the inpatient, than by completely divorcing the outpatient from the inpatient. We believe that the continuity in medical investigation, in nursing, and in social welfare which would be secured by a single service for the inpatient and the outpatient—who, after all, are generally the same person—is of paramount importance. The "separate block for outpatients" system which you advocate would perpetuate the condition existing in most hospitals today, whereby one group of doctors, nurses and almoners would deal with the outpatient, and another group with the inpatient.

In the hospital which we have the privilege to serve, the latest of the large voluntary hospitals built in this country, the following arrangements were deliberately planned to give a quick, full and efficient investigation to outpatients.

The hospital is vertically planned, with good lift service. The outpatients and inpatients, according to their disability, are accommodated on one floor. For instance, on the third floor of the hospital building, both medical outpatients and inpatients are dealt with. The lift and staircase lobby is the only dividing line between the in- and the outpatient. The floor possesses for these medical cases, whether in- or outpatient, its own almoner and clerks, its own clinical laboratory, its own cardiographic unit, and so on. The sister of the medical ward attends the outpatient clinics of her own physicians. She sees the man as an outpatient and knows all about him when subsequently he arrives in her ward as an inpatient. A fuller medical service is assured, inasmuch as at almost any hour during the day there is a physician, registrar, or house-physician available on that floor to see any outpatient who may, through urgency, come to the outpatient department on a day not appointed for the clinic.

The same arrangements apply to surgical patients, and with the specialist departments the advantages are even greater, inasmuch as the special equipment, special operating theatres, special instruments, &c., can be used for both inpatient and outpatient. Furthermore, the nursing staff experienced in eye work, or in any specialist branch of medicine, is available for both inpatient and outpatient.

One of us, having had 37 years' experience of hospital administration, would assure you that no economy in expenditure or staff would be secured by divorcing inpatients from outpatients. The maintenance of two blocks, for each of which a dispensing service, a nursing service and a kitchen service has to be provided, would, on the face of it, appear to add to cost. The suggestion that such outpatient block "would require only a comparatively small nursing staff to deal with tests and dressings," is misleading and unjustified.

We have put the result of much thought and careful planning to the test of experience at Westminster. We invite those interested to study the system at work, even in the adverse conditions obtaining after 4 years of war and a blitz.

In conclusion, we would sound a note of warning. The existence of a highly organised, efficient outpatient service will by no means reduce the demand upon beds, as implied in your article. The better the outpatient department, the greater the demand for beds. That is our experience.

E. ROCK CARLING
Consulting Surgeon.
CHARLES M. POWER
House Governor and Secretary.

Westminster Hospital,
S.W.1.

TONSILS AND ANTIBODIES

SIR,—Your leader shows a welcome spirit of tolerance for the pharyngeal lymphoid tissue. All tonsils except those of the newborn child contain living micro-organisms, picked up from food or air or both. Many of these organisms die, and to these the child is immune; others, to which he is not immune, live and produce toxins. From the tonsil these toxins pass to adjacent lymph nodes, and thence by efferent lymphatics to the tissues, evoking the formation of antibodies. The blood-stream carries the antibodies to the tonsil to destroy the organisms, the surplus antibodies remaining in the blood. The tonsil is therefore an inoculation organ through which immunity is built up and the child enabled to resist the infections current in the community in which he lives. Few children, if any, are born immune to all food or air-borne infections; most of them have to pass through many such infections before healthy adult life is reached. An attack recovered from may therefore be regarded as a stepping-stone towards increased immunity. The same duties are shared by the adenoid mass and the lymphoid follicles scattered about the mucous membranes of the body, including the Peyer's patches (which of course deal mainly with food-borne infections).

The crypts of the tonsil, however, form ideal breeding places for organisms, and though no such crypts are present in the adenoid mass it contains spaces between its folia in which organisms can lodge and multiply. Because of their size and structure the tonsils and adenoids are a more important section of what you have called the antibody factory than the smaller lymphoid follicles scattered about the mucous membranes. During childhood, then, they have important work to do which is interrupted by their removal; and unless they are harbouring an organism to which no further immunity is possible they should be left where they are.

Reasons usually given for removal of tonsils are: recurrent sore throats; and tonsillar sepsis or enlargement. If sore throats are an essential phase in the acquirement of immunity, removal for this reason cannot be justified. There are different degrees and forms of sepsis, but it is impossible to assess these by inspection. In the sense that they all carry micro-organisms all tonsils are septic; but the mere presence of organisms does not tell us that the production of antibodies has ceased. Large tonsils have been accused of hindering breathing and swallowing, but these are imaginary dangers. It is quite common to see a perfectly healthy child with very large tonsils, and mere bulk does not imply failure in performance.

Three main reasons given for the removal of adenoids are: mouth breathing; recurrent colds; and discharging ears. The adenoid mass, like the tonsils, enlarges when it is inflamed, and in that state might block the airway; but the condition is temporary, and the adenoid mass must rarely be large enough to obstruct breathing at other times. At operations on children for nasal obstruction it is not uncommon to find the adenoid mass quite small; such children, however, usually have a mucous or mucopurulent nasal discharge coming not from the adenoids but from the sinuses. In most of these cases transillumination shows an opaque sinus on one side or both. Sinusitis is accompanied by enlarged turbinals and these usually cause more obstruction when the child is lying down than when he is standing, so that the noise of obstructed breathing is more troublesome at night than in the daytime. Nasal obstruction in children, then, is often due to recurrent enlargement of the turbinals which may in turn be due to an infected ethmoid labyrinth. Small doses of potassium iodide (grains ½–3, depending on the age of the child) stimulate the mucous glands of the nose and drain the sinuses by increasing secretion. Like recurrent sore throats, recurrent colds have their place in the process by which immunity is acquired; so that they do not indicate adenectomy. Removal

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of adenoids is sometimes successful in reducing or stopping aural discharge in subacute or recurrent cases, many of which would have recovered in any case. In chronic cases it usually fails. Primary acute otitis, on the other hand, often follows removal of adenoids.

The main function of the tonsil and adenoid mass, then, is to pick up organisms from food or air or both, and to grow those to which an immunity is required. Until it is evident clinically that they contain an organism to which immunity is impossible, it would appear unwise to remove them.

Liverpool. P. W. LEATHART.

COUNTING LEUCOCYTES

SIR,—In view of the limited supply of standard pipettes for counting leucocytes, I have been encouraged to publish an alternative method, based on that of Strong for counting red cells, which has been found satisfactory.

3-inch Wassermann or Kahn tubes are fitted with corks (preferably rubber bungs), the latter being numbered in indelible pencil on the upper surface. From a clean 1 c.cm. graduated pipette 0·38 c.cm. of dilute (2%) acetic acid, suitably coloured, is accurately measured into each tube which is then stored upright. Blood is taken into a 20 c.mm. hæmoglobin pipette, blown into the acid and the pipette washed out. The cork is replaced and the tube, held in the right hand, is briefly shaken, with a circular movement, against the fingers of the left hand so that fluid does not reach the cork. The number of the tube is noted on the request form.

For the count, after similar but more thorough shaking, a sample of the dilution is transferred by means of a capillary (or hæmoglobin) pipette to a Neubauer counting chamber. The dilution is 1 in 20 and, if the cells in the four corner squares, each 1 sq. mm., are counted, the total is multiplied by 50.

If distilled water and acetone are carried, the pipette is readily cleaned and dried, and will serve for a round of blood-counts. It is much easier to get an even suspension in the tubes than in the bulb of the standard pipette, and safe transport of the specimens is simplified.

Claybury Emergency Hospital, Woodford Green. F. C. O. VALENTINE.

CONDITIONS OF MEDICAL SERVICE

SIR,—It was with great interest and still greater pleasure that I read in your issue of Oct. 30 the letter signed by 238 members of the British Medical Association. Not long ago, I, like others of the younger members, felt so disgusted at the policy of the BMA that I resigned membership. Working, as I was at that time, in a rather remote area, I was unable to attend the meetings of the local branch, as to do so would have meant nearly a day's absence from my practice. Only senior and well-established practitioners can afford to take risks of this kind, and unfortunately these same persons are not only very often reactionary in their outlook, but they have also quite definitely a vested interest at stake. These, on the whole, are the people who attend BMA meetings and their viewpoint is reflected in the decisions of the Annual Representative Meeting. The more enlightened minority has always been more or less inarticulate, and it is encouraging to see it coming to life at last. It is, I hope, after all the "little leaven" that "will leaven the whole lump." It has always seemed to me remarkable how little concerned a certain section of the profession appear to be with the welfare of the community, and how greatly concerned over the welfare of the doctor.

With the present shortage of doctors, which cannot be remedied all at once but which will persist for many years yet, surely the only way of meeting fairly the ever-increasing demand with a strictly limited supply is by organising a salaried medical service for the whole country. Before the war doctors, sad to say, often congregated where there was money and not where there was need.

The same issue of THE LANCET contains another letter in very different vein—that of Dr. Thomas Nelson. I must take exception to the suggestion that the present National Health Insurance capitation fee works out at sixpence per visit or consultation—I think that is what is inferred in the jibe about "state dope." On this assumption the practitioner earning £1100 a year from his panel would be seeing on the average 120 insured patients every day!

The chief objection to the panel system, or indeed to any competitive system, is that the more patients one has the less attention one can give them. Payment at "piece-work" rates does not necessarily improve matters as it may encourage either hurried imperfect work, or else unnecessary work. I have known a small local friendly society discontinue payment to doctors on a piece-work basis and substitute a capitation fee, simply because they discovered that a great many quite unnecessary visits were being paid. The medical profession, unfortunately, is no more honest than the rest of mankind.

Finally, does not a full-time salaried state medical service get rid once and for all of that dreadful anachronism whereby the young doctor must needs buy a practice before he can, with any hope of security, give his services to the community? Most of us have to borrow, and have consequently a millstone round our own (and our wives') necks for many years. Those lucky ones, who have been fortunately born, start in practice with no such handicap. Academic qualifications and practical experience should be all that are required in order that a man may serve the community to the full. It is high time a stop was put to the sentimental and mischievous nonsense talked about the alleged virtues of competition and the ennobling effects of struggle and self-denial.

Aberdeen. JOHN H. WILSON.

SIR,—The first happy days of a doctor's life are those spent at hospital as a senior student or as a resident. They are happy because his mental powers are devoted, without inhibition or ulterior motive, to the arts of clinical examination and the diagnosis and treatment of disease. Competition may be keen, not only between student and student but also between student and teaching staff; criticism is freely exchanged over successes and failures; but competition and criticism are always friendly.

Many members of my profession spent happy days in active service on land or at sea in the last Great War. They had little time to consider the pros and cons of a professional Service career; their only anxiety was to serve. Neither the Army nor the Navy is devoid of regulations, but it is certainly the rarest occurrence for either the enjoyment or the efficiency of a doctor's work in these Services to be hindered because he is a "slave of the state."

In general practice the doctor's environment is profoundly different. There is little or no friendly discussion with his colleagues in regard to his own patients; indeed he is too often justified in his fear lest one of his patients should be seen by a colleague. The failures of each doctor are pounced upon by another, his successes pass with praises unsung and are cynically attributed to a divine providence protecting the patient.

Diagnosis is often influenced by the patient's desire, which has to be considered, while the doctor's bread-and-butter depends on pleasing that patient. Not infrequently the diagnosis is determinedly made by the patient with the emphatic statement "I don't feel like work, I think I want a week's rest," after which statement clinical examination assumes a secondary importance and treatment is often not expected. Should clinical examination reveal no evidence of disease, the week's sickness would be granted rather than lose the patient or (what is more important) the bread-and-butter that he represents. It is difficult for the doctor to adopt a higher code of behaviour, for it is considered very proper to give the patient the benefit of the doubt.

Efficient examination is hindered at every turn by the expense of radiological or pathological investigations, often too expensive for the patient to bear, while the personal inconvenience and loss of time in obtaining such investigations at a voluntary hospital, under their present organisation, deters the patient from such a course. This is a criticism of the organisation of such hospitals, not of my colleagues who devote so much of their valuable time to their service.

Treatment sometimes has to be given when it is totally unnecessary, because the power of money gives

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the private patient the right to demand such treatment, while the power of a state contract (which is completely one-sided) gives every insured patient an equal right. On the other hand, some treatments sadly necessary, such as physiotherapy for the most prevalent of all diseases in this country—namely, rheumatism—or psychotherapy for the ever-growing number of functional ailments, are often not instituted, either because the patient cannot afford unavoidably expensive private treatment or because he cannot get it at a hospital without all the vexations of passing through the preliminaries of the general outpatient department.

Some of us, though engaged in general medical practice, have had a good many years' experience of part-time service in the municipal hospital services, in which capacity, if no "slave of the state," one is at least the servant of a municipality. Here again a doctor can live and work in the atmosphere of work for work's sake. He is brought into intimate contact with the whole-time salaried medical officers of such hospital, the association being as delightful as the associations of student days. Indeed the atmosphere is in all respects similar, with a complete absence of money values, a complete absence of jealousy, inhibitions, and ulterior motives.

It is of course true that in these vast municipal services "free choice of doctor" is as meaningless as it is for the 18 million or more of the population who rely so largely upon the voluntary hospitals for the diagnosis and treatment of most diseases other than mild ailments. In neither case does the patient, recommended to a hospital, ever make his attendance depend upon this choice of a particular member of the hospital's staff.

At its worst, could a whole-time state medical service be anything but a vast improvement on private medical practice at its best? I do not seek publicity and therefore must sign myself

A GENERAL PRACTITIONER.

DIPHTHERIA IN IMMUNISED CHILDREN

SIR,—In your issue of Oct. 16 (p. 490) you refer to the high incidence of diphtheria in immunised children in Dublin; and you state, apparently by way of explanation, "... but it should be noted that 35% or more of the children immunised in Dublin are estimated to have received only a single dose of alum precipitated toxoid."

A short time ago I made a detailed study of diphtheria statistics in Dublin, the results of which were in part published (*Irish J. med. Sci.* April–May, 1943). During the years 1935, 1936 and 1937 children received one injection of APT. Before that time they received three injections of TAF or TAM, and since then two injections of APT, each of 0·5 c.cm. Up to the end of 1942, 35·1% of the children immunised had received only one injection of prophylactic. The extent to which children immunised in 1934, when they received three injections of TAF, subsequently contracted diphtheria may be compared with the extent to which those immunised in 1935 and 1936 with one injection of APT contracted the disease. Of 9383 children immunised in 1934 with TAF, 78 had contracted the disease up to the end of 1942, giving an attack-rate of 8·4 per thousand. Of 30,180 receiving one injection of APT in 1935, 219 had contracted the disease up to the end of 1942, and of 11,193 receiving one injection of APT in 1936, 109 had contracted diphtheria by the end of 1942, giving attack-rates of 7·3 and 9·8 per thousand respectively. These figures do not suggest any difference between the protective effect of one injection of APT and that of three injections of TAF.

I have shown in my paper that there may be no difference between the protective effect of two injections of APT and that of one injection. This has been shown by comparing the attack-rates in those immunised by the two methods for the year of inoculation and two subsequent years, allowing a period of three months after immunisation to elapse before counting the cases, taking into consideration also the age-distribution of the immunised and fluctuations in the virulence of the disease. Thus the fact that so many received only one injection of prophylactic does not in itself explain the high incidence of diphtheria in immunised children. Notwithstanding the high proportion of children (75% of the child population at the end of 1941) who have received immunising injections, the returns for the present year show a higher incidence of diphtheria in Dublin than ever before. While evidence in favour of any influence of the present prophylactics on the incidence of diphtheria in Dublin is open to question, it does appear that the risk of a fatal issue is less in those who have been inoculated than in those who have not.

School of Pathology, Trinity College, Dublin. J. C. GAFFNEY.

STERILITY AND IMPAIRED FERTILITY

SIR,—The statement under this heading in your issue of Oct. 9 (p. 457) directs attention to the frequency of (physiological) sterility and to the need for an extension of facilities for its further investigation and treatment. With this part of the letter of your sixteen correspondents we are in agreement.

We do not, however, agree that "consideration of all available data strongly suggests that the barren and the very small family reflect lower fecundity rather than excessive unwillingness to reproduce." We believe that a definite pronouncement on these questions cannot be made until much more evidence becomes available. For example, we require to know the fertility trends in the major social groupings and the variation in the size of families according to social and economic levels, by date of and age at marriage. These are data which can only be ascertained by census inquiries. Meanwhile, there is much evidence that a major influence in the creation of the modern small family is voluntary restriction of fertility and that this has had its origin in changed social and ecomomic standards. Thus, so long as there is no adequate evidence of a difference in the *innate* fertility of different groupings it would seem to be safe to assume, for example, that the small families of the professional classes are due to voluntary restriction.

From the demographic standpoint, the central question at the present time is whether infecundity has *increased* in such a way as to play a part in the decline in fertility. At present there is no evidence to show that such an increase has played any part at all. There is no reason for thinking that fertility is any more affected by this cause now than it was 70 years ago, when the birth-rate was over 30 per thousand. In the effort to raise fertility, undoubtedly everything should be done to help parents who are involuntarily sterile; but the main object of policy must remain that of changing the social and economic conditions and the attitudes of normally fecund parents so as to favour the large rather than the small family.

A. M. CARR-SAUNDERS. R. M. TITMUSS.
D. V. GLASS. JAMES YOUNG.
EARDLEY HOLLAND. C. P. BLACKER.
HORDER,

Population Investigation Committee, 69, Eccleston Square, London, S.W.1.

A CHIEF'S FORESIGHT

SIR,—Your peripatetic correspondent is not quite correct in his reference to the Kikuyu: the Kikuyu are essentially agricultural. It was the Masai who sold their precious cattle to Liebig's to get the money to pay for M & B 693 to cure their gonorrhœa. The credit for this transaction is undoubtedly due to the patience and persuasive powers of the medical officer who taught the chiefs that the sterility of their women was largely caused by Neisser's organism and could be cured by drugs.

Devoran, Cornwall. JAMES H. SEQUEIRA.

MEDICAL MAN-POWER.—The Minister of Health in circular 2881 has passed on to hospital authorities the recommendation of the Medical Personnel (Priority) Committee that for the present the war-time establishment of hospitals shall not be increased and that no posts shall be upgraded. The post of medical superintendent is not covered by the recommendation but in considering applications from local authorities for permission to create these posts the Minister will feel bound to have regard for the committee's suggestion.

Last May the Minister informed public-health medical officers of military age that they must obtain his permission before applying for a new post. This procedure has now been extended to women medical officers holding whole-time public-health appointments who are over military age, but who were born after March 5, 1896.

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Obituary

FREDERIC JOHN POYNTON

M D LOND., F R C P

Dr. F. J. Poynton was born at Kelston Rectory, Bath, on June 26, 1869, and after an absorbing life as a London consultant, with rheumatism as his main interest, it was to Bath he retired to excogitate his experience, and there after surviving the blitz he died of a heart attack on Oct. 29. He was educated at Marlborough and University College, Bristol, entered St. Mary's Hospital with a scholarship and qualified in 1893. Seven years later he was appointed to the staff of Great Ormond Street, to follow in the steps of his master, Cheadle, and after another three years he became assistant physician to University College Hospital, with charge of the children's ward. During this time he was being tested as a clinician and teacher, revealing the eagerness to benefit medicine and the vivid approach to the child's personality which assured his professional career, combined with the honesty of purpose and the mischievous frankness of speech that endeared him to students. All this time he was publishing a steady stream of work on rheumatism in relation to the heart, in association now with David Lees on cardiac dilatation and again with Broadbent on changes in the myocardium. The year 1913 was the climax, for it was then that he collected in one volume the outcome of fifteen years of research with Alexander Paine, upholding the view that acute rheumatism is to be looked on as the result of infection by a diplococcus of the streptococcal group. They did not maintain that this invasion was the whole explanation, but the presence of the organism in the tissues was an essential factor in the disease. At the international congress of medicine, held that year in London, he also asserted that Paine's diplococcus, injected intravenously into rabbits, would produce any and every form of chronic arthritis. The controversy over these observations, at one time acute, has mellowed without dying away completely, as our correspondence columns showed in June of last year, when the old war-horse lamented that all his specimens had been destroyed by enemy action: "a loss, I think, to English medicine"—with which many will agree. That streptococci play an important contributory part in the ætiology of acute rheumatism is now generally regarded as being true.

Press Portrait Bureau

At the College of Physicians he was Bradshaw lecturer in 1924, holding office up to senior censorship in 1930 and after that meeting his colleagues regularly at the College Club. He was at his best there and as chairman of committees, for which he always made himself master of the subject in hand. His Lettsomian, Harben and Long Fox lectures were all full of meat. In 1931 he was president of the British Pædiatric Association. Outside London his work took him to the heart hospitals at West Wickham and Lancing, and the orthopædic hospital at Winford. He also advised the National Children Adoption Association.

Of the man himself H. L. T. has sent us the following sketch. "Poynton," he writes, "was a character and sometimes appeared almost wishful to be an oddity. He was a countryman, and deliberately retained a countryman's characteristics with a certain scorn of personal appearance. Short and stocky in build, he was enormously strong. He held the curious record of captaining a first-class county cricket eleven after attaining to the sober dignity of a fellow of the College of Physicians. His outstanding cricketing feat was achieved in two hours at Hove when he and Sammy Woods scored 305 runs at top speed for Somerset against Sussex, and he loved to recall the episode. In his cricketing days, he was always known as Joseph, and in the pavilion at Lord's during the big matches he would be affectionately greeted by many old friends. He played hockey for Middlesex and had some skill at real tennis. He had a fine tenor voice and sang for many years in the choir of St. James's Church. Unfortunately he allowed his professional life to be clouded by what he considered to be the unsympathetic attitude of the profession towards his researches on rheumatic fever, though his resentment never extended to individuals. When speaking in public and at medical meetings he seemed to delight in supporting some illogical standpoint, and while he amused his audience he was not taken very seriously. But when he dealt with a sick child he had a knack of talking spontaneously as if they were equals and every child felt at ease with him. He was a delightful personal friend and a great companion on a holiday. He enjoyed every moment, even when missing a critical short putt and backing his car by mistake on an outraged goat, which instantly attacked him. Life was not too kind to him and some blows left their mark, but to the end he retained his power of boyish enjoyment, his sincerity and his honesty and his love of children."

WILFRID BURTON WOOD

M D CAMB., F R C P, D P H

Dr. Burton Wood, who died at Panfield, Essex, on Nov. 3, just short of his 60th birthday, was a physician-scholar whose place will be hard to fill. Born at Southport, the second son of Peter F. Wood of Chislehurst, he was educated at the Leys School and Jesus College, Cambridge, where he took his MA in 1908, and qualified two years later from St. Bartholomew's Hospital. He then filled a series of house appointments before war broke out in 1914 and he joined the RAMC. He was with a landing party in Gallipoli, was transferred to Mesopotamia, and later to the North-West Frontier Force, where he was mentioned in dispatches. After the war he settled at Grays, where he became assistant MOH to Essex county, but soon returned to clinical medicine as physician to the London Chest Hospital and consultant for diseases of the chest to the Essex council. He did pioneer work on pulmonary asbestosis when it appeared in the twenties and became an authority on pulmonary tubercle in children. With F. G. Chandler he worked and wrote on the use of iodised oil in the diagnosis of thoracic disease, and was unremitting in his search for the relief of bronchiectasis. He had an extensive knowledge of English literature, wrote fluently and with a sure touch, and was a brilliant speaker. He was also no mean artist, and his accurate perception of line and contour made him an expert in the reading of the radiogram. Extensive travel had awakened his interest in post-graduate study, and overseas students especially owed much to his wise tutelage. He had long been subject to coronary disease which limited his freedom of movement but did not subdue his strenuous and active temperament, and in his remote country cottage he read much and wrote long letters. He is survived by his widow, a daughter of John Boston of Birkdale, and their three children.

Burton Wood, writes S. R. G., came into his own very late. The end of the last war found him on the North-West Frontier and he was a long time getting back to work and finding his real niche in the medical world. When he did, it was characteristic of him that he spared neither time nor labour, taking infinite pains with everything like the true artist that he was. His public speaking was remarkable. I have seen him get up in a meeting which had become utterly bored with dull speeches and galvanise it into alertness with his humour and apt quotation. At the hospital luncheon table he had a Chestertonian wit which spared none of his colleagues, but we laughed at his gaiety and never took it amiss. And somehow into the rush of modern life he brought an eighteenth-century spaciousness. Chest physicians have a curious habit of making diagrams. Wood never did that. His pictures were always three-dimensional and well proportioned. And so, too, was his outlook. The day after the hospital had been half destroyed by a bomb and my own department had been blown to pieces I received from him a copy of Lord David Cecil's essay on the English poets with the inscription on the fly-leaf "The City of God remaineth."

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JACK ARTHUR WAIN

M B WITWATERSRAND, F R C S E, D M R

Dr. J. A. Wain died on Oct. 25 in Manchester at the Christie Hospital, where he was one of the radiotherapists at the Holt Radium Institute. He was born and educated in South Africa, graduating MB, at the University of Witwatersrand, in 1929. After holding house-appointments at the Johannesburg General Hospital, he became resident medical officer at the Settlers Hospital, Grahamstown, for four years. Two years in general practice in the Cape Province followed, and in 1937 he came to this country and took the FRCSE a year later. Wain became interested in recent developments in radiotherapy and visited the Holt Radium Institute, where he found the work appealed to him so much that he decided to make it his specialty. He was appointed to the staff, where he remained, except for nine months in Edinburgh to take the DMR, until his death. As a senior member of the Institute staff, he had charge of special clinics at the Manchester Skin Hospital, the Blackpool Victoria Hospital, the Royal Lancaster infirmary, and the Wigan Infirmary. When war broke out his wife and baby girl returned to their home in South Africa, but Dr. Wain chose to remain with his Manchester friends and patients. He was 38 years of age.

Dr. HERMANN GUNTHER died on Oct. 28, at the house in Hampton Wick from which the family practice had been run since it was started by his father, Theodore Gunther, in 1863. Hermann was born there in 1872, but during his early schooldays he shared the congenial home of his uncle, Albert Gunther, FRS, at the British Museum. He attended University College School with his cousin R. T. Gunther, later to become curator of the Museum for the History of Science at Oxford. Against this background Hermann's taste for natural history and archæology developed and when, after qualifying from University College Hospital in 1896, he joined his father in practice he spent his leisure in learning all about his own district. He was a distinguished member of the Surrey Archæological Society, and his fellow members of the Japan Society often admired his collection of netsukes, the carved buttons worn by the Japanese at the end of their girdle cords. Gunther was also interested in the history of railways, especially the old L & SWR.

Births, Marriages and Deaths

BIRTHS

ALMOND.—On Nov. 2, in London, the wife of Surgeon Lieutenant R. G. P. Almond, RNVR—a son.

CAREY.—On Nov. 3, at Skegness, Lincs., the wife of Surgeon Lieut.-Commander Fraser Carey, RNVR—a daughter.

DESMOND.—On Oct. 11, in Bermuda, the wife of Surgeon Lieut.-Commander A. M. Desmond, FRCS, RNVR—a son.

DIXON.—On Nov. 3, in London, the wife of Wing-Commander F. W. P. Dixon, FRCS, RAF—a son.

MCENTEE.—On Nov. 6, at Cheam, the wife of Dr. J. C. McEntee—a daughter.

MELECK.—On Oct. 22, at Limpsfield, Surrey, the wife of Surgeon Lieutenant Simon Meleck, RNVR—a daughter.

ROCHE.—On Nov. 5, at Beaconsfield, the wife of Mr. A. E. Roche, FRCS—a son.

ROOKE.—On Nov. 5, at Hove, Sussex, the wife of Surgeon Lieutenant C. J. Rooke, RNVR—a daughter.

MARRIAGES

BARNSLEY—COOK.—On Oct. 30, at Storrington, Alan Gabriel Barnsley, lieutenant RAMC, to Edwina Eleanora Cook.

LEWIS—BENTHAM.—On Nov. 6, at Poynton, John Tudor Lewis, MD, to Cicely Bentham.

DEATHS

CLAPHAM.—On Nov. 6, Edward William Clapham, MRCS, of Britford, Salisbury, consulting anæsthetist to the London Hospital.

CRONK.—On Nov. 4, Herbert George Cronk, MB CAMB., aged 89.

DANIEL.—On Nov. 8, at Epsom, Edgar George Clement Daniel, MB CAMB., aged 74.

FENTON.—On Nov. 5, at Ilford, Charles Francis Fenton, MRCS.

GALBRAITH.—On Nov. 2, at Tonbridge, Samuel Nicol Galbraith, MB GLASG., DPH, late MOH for South West Kent, aged 59.

GOSTLING.—On Nov. 3, at York, George Wilfrid Gostling, MB LOND., aged 73.

GRANT-WILSON.—On Nov. 1, at Sidmouth, Charles Westbrooke Grant-Wilson, MRCS, aged 74.

HORGAN.—On Sept. 10, at Lisbon, David St. Helier Horgan, MB RUI, DO, late surgeon RN.

HORNE.—On Oct. 31, at Strathpeffer, John Howard Horne, MB EDIN., major IMS retd.

JOHNSTON.—On Nov. 1, at Petersfield, George Johnston, MD EDIN., MRCP.

LAFFAN.—On Oct. 29, in Torquay, Richard Charles Kirby Laffan, LRCSI & E, lieut.-colonel RAMC retd.

LEVIS.—On Nov. 5, at Bath, John Samuel Levis, MB NUI.

WOOD.—On Nov. 3, at Shalford Green, Essex, Wilfrid Burton Wood, MD CAMB., FRCP, DPH.

Notes and News

PROSPECTS IN MEDICAL EDUCATION

CONVOCATION of the University of London has adopted two resolutions which bear on the future of medical teaching to men and women. Of the 12 schools of the university providing clinical experience, one admits only women, two admit a limited quota of women, and the remainder do not accept women students. The West London Hospital, which gives preference to women, is not yet a university school. Convocation passed the following communication to the Court and Senate:

> "It is an essential part of the tradition and the public policy of the University that a woman seeking university education in London should not be placed at a disadvantage on the ground of her sex. In the opinion of Convocation it is essential that prompt measures should be taken to give effect to this policy in the Faculty of Medicine by the provision of greater facilities for the medical education of women."

Attention was also directed to the great opportunities for medical teaching available in the London County Council general, special and mental hospitals, the provisions made there for research and pathological work, the domiciliary and midwifery services of the council, and the school medical services. Convocation, impressed by these opportunities for the development and enrichment of medical education in London, urged the Court and Senate to explore them in consultation with the council, with a view to the closest possible coöperation.

IN MEMORY OF PRINCESS TSAHAI

Dr. Margaret Balfour, Lord Davies, Mr. Somerville Hastings, FRCS, Lord Horder, FRCP, Sir Philip Manson-Bahr, FRCP, and Miss E. Sylvia Pankhurst have signed an appeal issued by the fund for gifts to help in establishing a hospital in Ethiopia in memory of Princess Tsahai, daughter of the Emperor Haile Selassie. She trained as a nurse in this country and died at the age of 22 soon after her father's restoration to his throne. The Emperor has given a partially constructed hospital on the outskirts of Addis Ababa, near the hot springs. The first unit will accommodate 100 beds, and will comprise administrative offices, a general hospital, and a children's section. There are at present no separate wards for sick children in Ethiopia. The treatment and study of tropical diseases should occupy a major share in the activities of the hospital, and it is also hoped to provide a medical and nursing school. The Memorial Hospital council is sending immediately £3000 to roof the partially built hospital; £22,000 will be needed to complete the structure, and a further sum to equip and endow the hospital. The target is £100,000. All inquiries should be sent to the hon. secretary, 3, Charteris Road, Woodford Green, Essex, and donations to Lord Horder, c/o Messrs. H. Reynolds & Co., 9, Greenhalgh Walk, London, N.2.

EGHAM REHABILITATION CENTRE

THE Ministry of Labour has established a residential centre at Wood Lee, near Egham, Surrey, for men who, after an accident or illness, need reconditioning to make them fit to resume their usual occupation or to take a course of training for another one. The centre is intended for men between 18 and 50 who have passed the convalescent stage; admission is at present restricted to 100 men who have been discharged within a year from one of the Services or from a hospital in Civil Defence Regions Nos. 4–6 and 12, but accommodation is being extended. The courses will last 6–8 weeks and will be supervised by a medical officer, but medical treatment and nursing are not provided. Board and lodging and travelling expenses will be provided by the Ministry, and a man will receive a weekly allowance of from 9*s*. to 24*s*. a week, according to age, with extra payments for wife and children and upkeep of his home.

ESCAPISM IN SMITHFIELD

St. Bartholomew's Hospital has seen the paintings, drawings and sculpture of its staff in the first art exhibition held there since the beginning of the war. From a huge war poster by the exhibition's secretary to the charming miniatures of one of the nurses the variety was great; from the competent paintings of Sir Harold Gillies to the work of one of the porters all the talent in the hospital was well represented. Gillies chose a subject near to home in "Wet Sunday in Marylebone," the best of his contributions. The physicians inclined to more delicate expression in water-colour, and Dr. Geoffrey Bourne showed himself no mean artist with a

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Sussex landscape and an impression of Chiswick Reach painted with a subtle mistiness almost reminiscent of the physician's art. Dr. Hinds Howell contributed a strong, delightful woodland landscape. Among the other water-colours one by a student was outstanding; an oak tree by an English lane in the soft light of an October morning was the subject, and the impression was satisfying. This escapism—this deliberate turning to lighter thoughts and lighter subjects—was the keynote of the show, with the dismal exceptions provided by the secretary, who introduced a skyline of shattered masonry with morbid persistence. Expressive figures in plaster, wood and ivory by Miss Beth Jukes, were the work of a capable artist, and Mr. Brian Brooke had chiselled two heads in stone during his spare time from surgery.

There was creditable evidence of fresh ideas struggling for expression, and though the successful paintings stood out like good deeds in a slightly imperfect world the indications were that medicine and culture still go hand in hand.

University of Cambridge

On Oct. 30 the degrees of MB, B CHIR were conferred by proxy on J. W. Fawcett.

Royal College of Surgeons of England

The annual meeting of fellows and members will be held at the College, Lincoln's Inn Fields, London, W.C.2, on Thursday, Nov. 18, at 2.30 PM.

Royal College of Physicians of Ireland

At a meeting of the college on Oct. 18, Dr. W. G. Harvey was elected president. Dr. Harvey was, till he retired last year, one of the physicians to the Adelaide Hospital, Dublin. He has been a fellow of the college since 1908.

Royal College of Physicians of Edinburgh

At a meeting of the college held on Nov. 2, with Dr. Charles McNeil, the president, in the chair, Dr. Ian Murray (Glasgow) and Dr. Harry Stalker (Edinburgh) were introduced and took their seats as fellows. The Hill Pattison-Struthers bursaries in anatomy and physiology, and clinical medicine were awarded to W. R. Brown and P. D. Kemp respectively.

Royal Society

The Copley medal has been awarded to Sir Joseph Barcroft, FRS, for his work on respiration and the respiratory function of the blood, and the Davy medal to Prof. I. M. Heilbron, D SC, FRS, for his contributions to organic chemistry, especially to the chemistry of natural products of physiological importance.

Royal Society of Medicine

At a joint meeting of the sections of physical medicine and disease in children on Wednesday, Nov. 17, at 4 PM there will be a discussion on anterior poliomyelitis. The opening speakers are to be Major William Stewart, USAMC, Dr. Queenie May and Mr. Eric Lloyd. On Nov. 18, at 2.30 PM, Brigadier Hugh Cairns will deliver his presidential address to the section of neurology. He will speak on gunshot wounds in the head and afterwards there will be a discussion. Cases will be shown at the meeting of the section of dermatology at 4 PM on the same day. On Nov. 19, at 4 PM, Dr. Albert Sharman will read a paper to the section of obstetrics and gynæcology on some recent studies and investigations in sterility. On the same day at 4.45 PM the section of radiology will meet to discuss the organisation of a fluoroscopic service for the civilian community. The openers are to be Dr. Maurice Davidson, Major Peter Kerley, Dr. P. D'Arcy Hart and Wing-Commander R. R. Trail.

Campaign against Colds

For the third winter in succession the Ministry of Health, in coöperation with the Ministry of Information, is launching a campaign to reduce the spread of colds, influenza and other droplet infections. The public will again be urged to "help to keep the nation fighting fit" by avoiding careless coughing and sneezing. Posters, vehicle bills, window displays and films will be used. As before, copies in 35 mm. sound and 16 mm. sound of "Breath of Danger" (9 minutes), and of "The Nose Has It" (5 minutes) may be borrowed from the Central Film Library, Imperial Institute, Kensington, London, S.W.7. "Breath of Danger" may also be borrowed from the Central Council for Health Education, Tavistock House, Tavistock Square, W.C.1, which made it. The council also offers health leaflets and posters for sale to local authorities.

Eugenics Society

On Tuesday, Nov. 16, at 5 PM, at the rooms of the Royal Society, Burlington House, Piccadilly, W.1, Mr. R. M. Titmuss will speak on social environment and eugenics.

Paddington Medical Society

On Tuesday, Nov. 16, at 8.45 PM, at St. Mary's Hospital, Paddington, W.2, Mr. A. Dickson Wright will lecture on recent advances in surgery.

Royal Society of Tropical Medicine and Hygiene

A meeting will be held at 26, Portland Place, London, W.1, on Thursday, Nov. 18, at 3 PM, when Lieut.-Colonel Ernest Bulmer will read a paper on tropical diseases in soldiers in the Middle East.

Thoracic Surgery at Preston Hall Sanatorium

Major thoracic surgery has been discontinued at Preston Hall, Maidstone, since Laurence O'Shaughnessy was killed in France in 1940. It is now hoped to use Preston Hall as a centre for the surgical treatment of patients from all three institutions now under the British Legion, the others being Nayland Sanatorium near Colchester, and Douglas House, Bournemouth. Surgeon Commander G. A. Mason has been appointed thoracic surgeon to the British Legion Village from Nov. 1.

Faculty of Radiologists

The diagnosis section will meet at 32, Welbeck Street, London, W.1, on Saturday, Nov. 20, at 10.30 AM, when Captain P. P. Hauch, RCAMC, will speak on pneumoroentgenography of the knee-joint, Dr. E. Rohan Williams on venous intravasation during utero-salpingography, and Dr. John Wilkie on a case of Albright's disease.

Bernhard Baron Grants

The Charities Fund have made a grant of £30,000 to Queen Charlotte's Hospital to provide more accommodation for maternity cases. The grant is conditional on a section of the partly built nurses' home being completed by the end of next year. The fund has also granted £10,000 to the British Empire Cancer Campaign and £5000 to the Robert Jones and Agnes Hunt Orthopædic Hospital.

London Association of Medical Women's Federation

At a meeting to be held at BMA House, Tavistock Square, London, W.C.1, on Saturday, Nov. 20, at 3 PM, Dr. Ian Skottowe will discuss some current methods of treatment in psychological medicine.

Medical Casualties

The following casualties among RAMC officers have been announced:

Wounded.—Captain E. M. Leyland, MB EDIN., Captain F. M. Steel, MB GLASG., and Captain J. R. Tocher, MB ABERD.

Prisoner of War.—Major K. C. Hutchin, MB GLASG.

THE makers of Insulin A.B. and Insulin 'Wellcome' brand announce that, following the adoption of improved production methods, the prices of these products will be reduced on Jan. 1, 1944, to correspond with those now in force for H-A-B Insulin and Insulin Hospital Packing (BWCo). In consequence the issue of hospital packings will cease on that date and the makers will supply Insulin A.B. or Insulin 'Wellcome' brand whenever insulin is ordered.

THE epidemic of poliomyelitis in Malta described by Prof. H. J. Seddon (*Lancet*, Oct. 30, p. 549) occurred between November, 1942, and March, 1943.

Appointments

CLYNE, D. G. Wilson, BM OXFD, MRCOG: temp. gynæcologist to the Hampstead General and North-West London Hospital.

NEWELL, A. G., MD GLASG., DPH: temp. MOH, school MO for Blyth and MO to the River Blyth port health authority.

NORRIS, D. C., MD LOND., FRCS: part-time surgical registrar to the outpatient department at the Royal National Orthopædic Hospital, London.

PARRY-EDWARDS, O. J., MB DUBL.: asst MOH and school MO for Anglesey and medical superintendent of Valley Emergency Hospital.

SAMES, C. P., MB LOND., FRCS: part-time surgical registrar to the outpatient department at the Royal National Orthopædic Hospital, London.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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PATULIN IN THE COMMON COLD

COLLABORATIVE RESEARCH ON A DERIVATIVE OF *PENICILLIUM PATULUM* BAINIER

I. Introduction

HAROLD RAISTRICK, SC D CAMB, F R S

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WORKERS in this laboratory have been engaged for some years in a systematic study of the metabolic products of the lower fungi (moulds). A large number of these substances has been isolated in a state of purity and in many instances their chemical structure has been determined and some of them have been synthesised. In the last two or three years the antibacterial activity in vitro of some of these mould metabolic products has been investigated (Raistrick and Smith 1941, Oxford, Raistrick and Smith 1942, Oxford 1942 (a) and (b), Oxford and Raistrick 1942, Birkinshaw, Raistrick and Smith 1942). Some time ago a metabolic product of *Penicillium patulum* Bainier which had not been previously encountered here was isolated and shown to have antibacterial properties; it has now been identified as *anhydro - 3 - hydroxymethylene - tetrahydro - γ - pyrone - 2-carboxylic acid*, and has been given the shorter name of "patulin."

Soon after its isolation the new antibacterial substance was sent to Dr. W. E. Gye for another purpose. It happened however that at the time he had a severe common cold, and knowing that the antibacterial substance was equally effective against gram-positive and gram-negative organisms he tested it on himself. The outcome was sufficiently encouraging for him to repeat the test on other members of his staff, and the results obtained justified the extension of the trials in a series of controlled experiments. We were fortunate in enlisting the help of Surgeon Vice-Admiral Sir Sheldon Dudley, Medical Director-General of the Navy, and through his good services a fully controlled trial was carried out by Surgeon Commander W. A. Hopkins at a Naval establishment. The results obtained by Commander Hopkins have been examined statistically by Prof. Major Greenwood. In the meantime work was in active progress in this laboratory to determine the optimum conditions for the formation of the new antibacterial substance, and also to settle its chemical structure.

The results of this collaborative research are given in detail below and it will be seen that the clinical possibilities of patulin are promising. Since, however, it is desirable firmly to establish the value of the preparation and its complete freedom from danger when used as proposed, the material will not be released for general issue pending the completion of further large-scale confirmatory trials. Arrangements have been made with the Therapeutic Research Corporation of Great Britain for the manufacture of adequate quantities of the pure antibacterial substance for these trials.

II. Biochemistry and Chemistry

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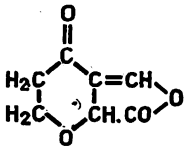
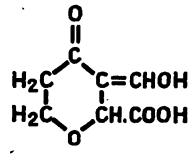
Filtrates from cultures of two strains of *P. patulum* Bainier grown on Raulin-Thom medium completely inhibit the growth of *Staph. aureus* at dilutions of 1 : 80 to 1 : 160. The substance causing this inhibition has been isolated in pure crystalline form in yields, with one strain of *P. patulum*, of more than one gramme per litre of culture filtrate. The pure antibacterial substance completely inhibits the growth of *Staph. aureus* at a concentration of 1 : 64,000 and is believed to be anhydro-3-hydroxymethylene - tetrahydro - γ - pyrone -2-carboxylic acid of structure 1.

The experimental evidence on which this suggested structural formula is based is as follows. Patulin is a colourless, beautifully crystalline substance with a melting point of 111° C. and the empirical formula, $C_7H_8O_4$. It has one active hydrogen atom in the molecule in pyridine solution, no carbon methyl group and is optically inactive. It forms a mono-2 : 4-dinitrophenylhydrazone and a phenylhydrazone and thus contains the -CO- grouping. It also forms a mono-acetyl derivative. We believe that the keto-enol grouping, $-CH_2.CO- \rightleftharpoons -CH = C(OH)-$ is the grouping which furnishes the active H atom, gives the mono-2 : 4-dinitrophenylhydrazone and phenylhydrazone (as the keto form) and the acetyl derivative (as the enol form).

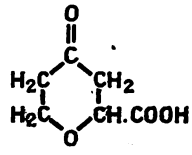
An aqueous solution of patulin is neutral to litmus and does not titrate as an acid. Hence it cannot contain a free -COOH group. However, on treatment with an excess of cold N/10 aqueous sodium hydroxide for 2–3 hours nearly 2 equivalents of acid are unmasked. The



Structure 1



Structure 2



Structure 3

solution, at first colourless, becomes bright yellow and now gives a strong red colour with ferric chloride whereas the parent substance gives no colour with this reagent. We suggest that these facts can be readily explained by assigning structure 2 to the, at present, unisolated hydrolysis product which would thus be 3-hydroxymethylene-tetrahydro-γ-pyrone-2-carboxylic acid.

The position of the carbonyl, = CO, group as γ to the potential carboxyl group in structure 1 was established as follows. On heating patulin with concentrated hydriodic acid there is formed, in good yield, a crystalline iodo-acid, $C_6H_9O_2I$, which was shown to be γ-keto-ε-iodo-*n*-hexanoic acid, $CH_2I.CH_2.CO.CH_2.CH_2.COOH$, which, on reduction with zinc and HCl, gave γ-keto-*n*-hexanoic acid, $CH_3.CH_2.CO.CH_2.CH_2.COOH$.

It will be seen that the above iodo-acid contains one carbon atom less than the parent substance (i.e., C_6 against C_7). The position of attachment of this missing carbon atom was shown to be β to the potential carboxyl group in structure 1, as follows. Patulin was reduced catalytically with hydrogen and Adams's platinum oxide catalyst. The resulting syrup, on further reduction with concentrated HI and red phosphorus, gave the lactone of β-methyl-γ-hydroxy-*n*-hexanoic acid, $CH_3.CH_2.CHOH.CHCH_2.CH_2.COOH$ and β-methyl-caproic acid, $CH_3.CH_2.CH_2.CHCH_3.CH_2.COOH$.

Finally, when patulin is hydrolysed by boiling with 2N. H_2SO_4, there is formed almost 1 molecule of formic acid, and in smaller yield a monobasic acid, $C_6H_8O_4$, according to the equation

$$C_7H_8O_4 + 2H_2O \longrightarrow H.COOH + C_6H_8O_4$$

The acid, $C_6H_8O_4$, has been conclusively shown to be optically inactive tetrahydro-γ-pyrone-2-carboxylic acid of structure 3. Since it has already been shown that the grouping, almost certainly the hydroxymethylene group, = CHOH, which gives rise to the formic acid, is attached to the carbon atom β to the COOH group, the immediate precursor of formic acid and tetrahydro-γ-pyrone-2-carboxylic acid of structure 3 must have structure 2. The abstraction of water from structure 2 to give a structural formula depicting the known properties of patulin leads to structure 1 or one of the tautomeric forms.

Experimental

History and description of cultures.—Two cultures identified as strains of *P. patulum* Bainier were used throughout this work. They bear the LSHTM catalogue numbers P 189 and Ad 77. We are indebted to our colleague, Mr. George Smith, for the following description of these two strains:

Strain P 189 was obtained from the Centraalbureau voor Schimmelcultures, Baarn, Holland, in 1935, as *P. Lagerheimi* Westling, CBS isolation. The type strain of Westling's species is not available for comparison, but Westling's description (1911) is sufficiently definite to leave no doubt that P 189 is not his species. Thom places *P. lagerheimi* in the biverticillata-symmetrica, while the CBS culture is a member of the asymmetrica-fasciculata, and is very similar in general

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appearance to *P. urticæ* Bainier, a well-defined and easily recognised species of which there are two strains in the LSHTM collection. It differs however from *P. urticæ* in its more restricted growth, in lack of odour and in its less complex type of penicillus, and fits very well with Thom's description of *P. patulum* Bainier (Thom 1930). The CBS seem to have some doubt as to the correctness of their identification of this strain, since, after being listed in 1934 and 1935, it did not appear in the 1936 and subsequent catalogues. Unfortunately it is impossible, under present conditions, to ask the CBS their reason for the withdrawal.

Strain Ad 77 was isolated in 1926 by J. H. V. Charles from condenser water. It was one of the species used by Birkinshaw and others (1931) in an investigation of glucose metabolism by species of Penicillium, but was not definitely identified. In culture on liquid media, as used in this investigation, it is indistinguishable from P 189. On agar media the two are indistinguishable in the early stages of growth, but after about two weeks Ad 77 begins to show somewhat more marked fasciculation and more definite zonation than P 189. The differences, however, are no more pronounced than would be normally expected in different strains of the same species.

CULTURAL CONDITIONS

Patulin is produced by both mould strains, P 189 and Ad 77, on a variety of synthetic liquid culture media, but we have found that a Raulin-Thom medium of the following composition gives the most consistently reliable results:

Glucose, 75 g.; tartaric acid, 4 g.; diammonium tartrate, 4 g.; $(NH_4)_2HPO_4$, 0·6 g.; K_2CO_3, 0·6 g.; $MgCO_3$, 0·4 g.; $(NH_4)_2SO_4$, 0·25 g.; $ZnSO_4$, $7H_2O$, 0·07 g.; $FeSO_4$, $7H_2O$, 0·07 g.; distilled water, 1500 ml.

This medium was distributed in 350 ml. amounts in each of a number of one litre conical flasks plugged with cotton-wool. The flasks were sterilised by autoclaving and each flask was then sown with a spore suspension in sterile distilled water of P 189 or Ad 77 prepared from cultures grown for about two weeks on beer-wort agar. The flasks were then incubated in the dark at 24° C. for 12–14 days. We are indebted to Mr. Smith for the preparation of the cultures and the inoculation of the flasks.

Growth of both strains of fungus on the above medium was vigorous. In the early stages the upper surface was white, changing towards the end of the incubation period to light green. The reverse of the mycelium was a characteristic brick red. The metabolism solution gradually changed colour from an initial very pale yellow to brownish-yellow.

The course of the formation of patulin was followed by frequent assays during the incubation period of the antibacterial potency of the metabolism solution against *Staph. aureus* LSHTM strain. The serial dilution method of assay was used (Oxford, Raistrick and Smith 1942), and we are indebted to Mr. Smith and Mrs. J. M. Webb for the results obtained. When the antibacterial activity had reached a maximum, usually on the 13th or 14th day of incubation, the flasks were harvested. Details of typical experiments are given in the table.

ISOLATION AND PURIFICATION

At the end of the incubation period the metabolism solution was separated by filtration from the mould mycelium and the clear filtrate was evaporated, without further treatment, in vacuo, at a bath temperature of 40–45° C. to about a twentieth of its volume. Patulin may be separated from the concentrate by either of the following methods, depending on the apparatus available:

(*a*) If a satisfactory continuous extraction apparatus is available the concentrate is extracted with ether in such an apparatus.

(*b*) If such an apparatus is not available the concentrate is extracted three times with an equal volume each time of ethyl acetate. The combined ethyl acetate extracts are washed with a little water, dried over anhydrous Na_2SO_4, and evaporated in vacuo to remove as much of the ethyl acetate as possible. The residual oil, which may partially crystallise, is then extracted with ether and the small amount of dark insoluble material is removed by filtration.

The ethereal solution, whether obtained by method (*a*) or (*b*), was diluted with ether and passed through a column of Al_2O_3 (BDH for adsorption) which had been previously washed with dilute HCl and dried at 100° C. The column was then washed with an equal volume of ether and the combined filtrate and washings were evaporated to small bulk. The ether concentrate was held at 0° C. for 24 hours and patulin separated in large colourless tablets which are almost analytically pure. These were separated by filtration, washed with ether and dried. Further concentration of the mother liquors gave a second crop of somewhat less pure patulin.

The final ethereal mother liquors contained a number of other metabolic products, some of which have been obtained in a state of purity though none of them shows any antibacterial properties. A description of these products is reserved for a later communication.

DETAILS OF SOME TYPICAL EXPERIMENTS

Strain of *P. patulum*	Incubation period (days)	Residual glucose by polarimeter (%)	pH	Inhibition against *Staph. aureus*		Method of extraction	Yield of pure patulin g. per litre of metabolism solution
				Complete	Partial		
P 189	14	1·45	3·2	1:80	1:160	(*a*)	0·70
P 189	12	1·50	3·2	1:80	1:160	(*b*)	0·75
Ad 77	14	0·74	5·0	1:160	1:320	(*b*)	1·26
Ad 77	14	0·86	3·9	1:160	1:640	(*a*)	1·09

Typical experiment with P. patulum, *strain Ad 77.*—No. of flasks, 52; incubation period, 14 days; residual glucose, 0·61%; pH, 4·9. Inhibition of *Staph. aureus*—1:160 complete; 1:320 partial. Volume of metabolism solution treated, 16·2 l.; final volume after evaporation in vacuo, about 1 l. Method of extraction (*b*); 65 g. of residual oil dissolved in 1·5 l. of ether, passed through a column of Al_2O_3 (200 g., length 20 in., diameter 1 in.) and washed with 1·5 l. of ether; evaporated to 250 ml. First crop of patulin: wt. 19·6 g., MP 110° C.; colourless tablets. Second crop of patulin (ex 80 ml. of mother liquor): wt. 1·6 g., MP 110° C.

The material obtained as a first crop from the ether concentrate is already sufficiently pure for most purposes. If desired, it may be obtained in a state of complete purity and constant MP (111° C.) by recrystallisation from ether, benzene or chloroform.

GENERAL PROPERTIES

Patulin crystallises from ether in colourless, compact prisms or thick plates, often of a considerable size. MP, 111° C. (with some decomposition). Found: C, 54·64, 54·56; H, 4·15, 4·13%; N, nil; OCH_3, nil; mol. wt., cryoscopic in dioxane (Dr. A. E. Oxford) 171 ± 10%. $C_7H_6O_4$ requires C, 54·55; H, 3·93%; mol. wt., 154.

In a Zerewitinoff estimation carried out in pyridine at 23° C. the substance gave methane corresponding to 1·03 active hydrogen atoms per molecule and in anisole at 22° C. 0·42 active hydrogen atoms. A C-methyl group estimation carried out by the Kuhn-Roth method gave 0·75% CH_3; theoretical for 1 C-methyl group, 9·74%. Patulin therefore contains no C-methyl group.

Patulin is optically inactive. It is soluble in water and in most of the commoner organic solvents except light petroleum. When a 1% aqueous solution is shaken with an equal volume of ether at room temperature about 35% of the substance is dissolved by the ether. Under comparable conditions ethyl acetate extracts 75% and amyl acetate 62%. An aqueous solution of patulin is neutral to litmus and does not titrate as an acid. The substance gives no reaction with aqueous ferric chloride or with Schiff's reagent for aldehydes. It reduces Fehling's solution strongly on heating and immediately decolorises soda-alkaline potassium permanganate in the cold. It also slowly reduces ammoniacal silver nitrate with deposition of metallic silver.

The substance completely inhibits the growth of the LSHTM strain of *Staph. aureus* at a concentration of 1:64,000 and partially inhibits growth at 1:128,000.

A freshly made solution of patulin in distilled water is colourless, but after standing for about 14 days at

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room temperature a yellow tinge is observable and the solution now gives a reddish colour with ferric chloride. Acid is also produced. Thus 10 ml. of a M/20 aqueous solution, after standing for 17 days at room temperature, required 1·65 ml. of N/10 NaOH for neutralisation to phenolphthalein. When a solution of patulin is treated with KIO_4 little or no action occurs, but after a preliminary cold hydrolysis of patulin by N/10 NaOH (see below) there is a rapid utilisation of 2 mol. of KIO_4 (in ½ hour) with the production of 1 mol. of formic acid and about 0·8 mol. of CO_2. No volatile aldehydes were detected.

DERIVATIVES OF PATULIN

(1) *Acetyl derivative.*—A mixture of acetic anhydride, 5 ml., and anhydrous sodium acetate, 1 g., was boiled. After cooling to 100° C., 1 g. of finely powdered patulin was added, the mixture shaken and allowed to cool to room temperature. Water, 20 ml., was added with stirring and the acetyl derivative rapidly crystallised. After chilling, the crystals were collected. Wt., 1·18 g.; MP 116–117° C. On recrystallisation from 50% aqueous ethanol, *acetyl patulin* separated in colourless prisms, MP 118° C., re-setting on cooling and re-melting at the same temperature. Found: C, 54·99, 54·98; H, 4·03, 4·12; C-methyl, 7·87, 7·65%. $C_9H_8O_5$ (i.e., $C_7H_5O_3{\cdot}O{\cdot}CO{\cdot}CH_3$) requires C, 55·11; H, 4·11; 1 CH_3, 7·66%. Since patulin contains no carbon-methyl groups the Kuhn-Roth estimation of carbon-methyl groups in acetyl patulin indicates clearly that this compound is a *mono*-acetyl derivative.

The acetyl derivative gave 0·31 active hydrogen atoms per mol. in pyridine at 25° C. and 0·24 active hydrogen atoms in anisole at 20° C.

Brady's reagent (2 : 4-dinitrophenylhydrazine in aqueous 2N HCl; 50 ml.) was added to a solution of the acetyl derivative (0·1 g.) in ethanol (10 ml.). The yellow crystalline precipitate which separated after some time was collected and recrystallised from methanol. It proved to be the 2 : 4-dinitrophenylhydrazone of patulin (see next section), with the same crystalline form, behaviour on heating and analysis. Found: C, 46·19; H, 3·26; N, 16·9%. $C_{13}H_{10}O_7N_4$ requires C, 46·72; H, 3·02; N, 16·8%. The acetyl derivative is thus very easily hydrolysed by cold dilute mineral acid.

(2) *Mono-2 : 4-dinitrophenylhydrazone.*—Brady's reagent (2 : 4-dinitrophenylhydrazine in 2N. HCl, 500 ml.) was added to a solution of patulin, 0·2 g., in water, 20 ml. The yellow crystalline precipitate which first appeared after 15 min. was separated by filtration after 3 hours, washed with water and dried. Wt. 0·1 g. It was recrystallised from methanol and formed long yellow needles, which on heating turned red at 185° C. and as the temperature was raised to 310° C. gradually darkened without melting. Found: C, 46·83, 46·83; H, 3·36, 3·10; N, 16·4, 16·5%. $C_{13}H_{10}O_7N_4$ requires C, 46·72; H, 3·02; N, 16·8%. That this derivative is a *mono*-2 : 4-dinitrophenylhydrazone is indicated by the analysis and by the fact that it gives a red colour with alcoholic potash (Neuberg reaction). It is insoluble in aqueous sodium carbonate. Its blood-red solution in aqueous potash becomes yellow on acidification.

(3) *Phenylhydrazone.*—A warm (T about 50° C.) filtered solution of phenylhydrazine hydrochloride, 1 g., in water, 25 ml., was added to patulin, 0·2 g. Patulin rapidly dissolved and glistening orange plates separated, MP 152–153° C. Found: C, 63·50; H, 5·06; N, 11·2%. $C_{13}H_{12}O_3N_2$ requires C, 63·93; H, 4·94; N, 11·4%.

The derivative is not a pyrazoline since it gives a negative Knorr's reaction with $K_2Cr_2O_7$ and conc. H_2SO_4.

ALKALINE HYDROLYSIS OF PATULIN

(*a*) *In the cold with excess of NaOH.*—A M/20 aqueous solution of patulin, 5 ml., was treated in a stoppered flask with an excess of N/10 NaOH, 10 ml. A bright yellow colour developed, and after standing at room temperature for 2 hours 5·20 ml. of N/10 HCl was required for neutralisation to pH 7 (bromothymol blue, fugitive end-point). The acidity unmasked is therefore equivalent to 4·80 ml. N/10 acid; theoretical, for 2 equivalents of acid, 5·00 ml. The neutralised solution (solution A) was acidified by the addition of 10 ml. of N/10 HCl and this solution was held at room temperature for 24 hours, after which time 9·25 ml. N/10 NaOH was required for neutralisation to bromothymol blue, pH 7 (solution B). The decrease in acidity, probably due to ring closure, is therefore 0·75 ml. of N/10 acid; theoretical, for complete ring closure, 5·00 ml. of N/10 acid.

No deep-seated change appears to take place on treating patulin with an excess of cold sodium hydroxide as described above since no formic acid could be detected (cf. section (*c*) below) so that it may be concluded that reversion from structure 2 to structure 1 can only be brought about to a small extent by simple acidification. This conclusion is supported by the fact that in solution A patulin (and/or its reaction products) had an antibacterial activity of 1 : 800; in solution B 1 : 2,000; and in the control untreated solution 1 : 60,000. Further, both solutions A and B gave a strong red colour with ferric chloride whereas the parent substance gives no colour with this reagent.

(*b*) *In the cold with 1 equivalent of NaOH.*—A solution of patulin, 0·462 g. (≡ 3 milliequiv.) in water, 20 ml., was treated with cold N/10 NaOH, 30·00 ml. The mixture, which reached a maximum yellow colour in ½ hour, was held at room temperature for 18 hours. Final pH, 6·5. The antibacterial activity of this solution was about a third of that of a freshly made aqueous solution of the same concentration (0·462 g. of patulin in 50 ml. of water); 40 ml. of the alkali-treated solution were extracted with ethyl acetate. Wt. (corrected) of unchanged patulin recovered = 0·1176 g. ≡ 32% of that originally present.

The experiment was repeated, adding the NaOH more slowly. To a solution of patulin 0·154 g. in water, 10 ml., a few drops of thymol-phthalein were added. N/10 NaOH was now added drop by drop from a burette to the first tinge of blue. Further NaOH was added from time to time as the blue colour disappeared until a total of 10 ml. had been added. The mixture was held at room temperature overnight and was then extracted with ethyl acetate. Wt. (corrected) of patulin recovered = 0·0453 g. ≡ 29% of that originally present.

(*c*) *On heating with excess of NaOH.*—More extensive degradation of patulin takes place when it is heated with NaOH. This was demonstrated as follows:

A solution of patulin, 2·0039 g., in water, 5 ml., and N/1 NaOH, 50·00 ml., was made. On standing for a short time the solution became bright yellow and gave a red ferric chloride reaction. It was then boiled, under reflux and in an atmosphere of oxygen-free nitrogen, for 40 min., when the colour of the solution changed to reddish-brown. Titration of the solution, which no longer gave a colour with ferric chloride, showed that 24·1 ml. N/1 acid had been formed (calculated for 2 equivalents of acid, 26·0 ml.)

Thus 1·85 equivalents of acid per mol. of patulin had been formed, which quantitatively is substantially the same as is formed on cold hydrolysis (see section *a*), but qualitatively is quite different, since formic acid was shown to be one of the products of hot hydrolysis as follows:

N/1 H_2SO_4 (25 ml.) was added to the neutralised solution and the volatile acids were separated by exhaustive distillation in vacuo at 40–45° C. The distillate was titrated with N/1 NaOH, and 9·0 ml. N/1 NaOH was required for neutralisation ≡ 0·7 equivalent of total volatile acids. The neutralised distillate was evaporated to dryness. Estimation of the formic acid content of the dried residue by Fincke's method (1913)—i.e., by reduction of $HgCl_2$ to Hg_2Cl_2—showed it to contain 0·675 equivalent of formic acid.

The hydrolysis solution, from which volatile acids, had been removed, contains a mixture of substances none of which has been satisfactorily characterised.

ACID HYDROLYSIS OF PATULIN

A solution of patulin, 1·068 g., in 2N H_2SO_4, 50 ml., was boiled for 6 hours under reflux in a stream of nitrogen which was bubbled through standard baryta. *No CO_2 was formed during the hydrolysis.* The hydrolysis solution was brownish-yellow; 1·8 equivalents of acid were formed during the reaction (in other experiments 1·86 and 2·0 equivalents of acid per mol. of patulin were formed). The volatile acids were separated by exhaustive distillation in vacuo as described in section (*c*) of alkaline hydrolysis. They amounted to 0·735 and

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0·82 equivalents per mol. of patulin in separate experiments and on estimation by Fincke's method (1913) were shown to consist exclusively of formic acid. The identity of the volatile acid as formic acid was conclusively proved by isolation as the lead salt which was obtained as long colourless needles from water. Found: C, 8·47; H, 0·66; Pb, 69·3%. Calculated for $C_2H_2O_4Pb$: C, 8·08; H, 0·68; Pb, 69·7%.

The solution from which the volatile acids had been removed was extracted with ether in a continuous extraction apparatus. The yellow ether extract was dried over anhydrous sodium sulphate. On removal of the solvent there remained a pale yellow syrup (wt. = 0·52 g.), which partially crystallised on standing. It was tiled and the solid material was crystallised from ether-light petroleum (boiling-point 40–60° C.) and purified for analysis by sublimation in a high vacuum. Found: C, 49·96, 49·60; H, 5·65, 5·62%; equivalent by titration, 145·6. $C_6H_8O_4$ requires C, 49·97; H, 5·60%. Equivalent, titrating as a monobasic acid, 144.

The recovery yield of the purified hydrolysis acid was only about 10%, but large losses were unavoidable because of the nature of the primary ether extract which undoubtedly contains other hydrolysis products, the nature of which has not yet been established. Nevertheless, in spite of the small recovery yield, we believe that acid hydrolysis of patulin proceeds *ideally* according to the equation:

$$C_7H_6O_4 + 2H_2O \longrightarrow C_6H_8O_4 + H.COOH$$

General properties of the acid hydrolysis product, $C_6H_8O_4$.—The acid crystallises in colourless needles, MP 120° C. It is very soluble in ethanol or chloroform, moderately soluble in ether or benzene, and insoluble in light petroleum. It is optically inactive. It gives no appreciable colour with aqueous ferric chloride. It is a strong acid, blueing congo-red. It titrates sharply as a monobasic acid and without indication of the presence of a lactone grouping. It is almost devoid of antibacterial activity since it only gives partial inhibition of the growth of *Staph. aureus* at a concentration of 1 : 200.

The acid gave 1·39 active H atoms in pyridine at 18° C. and 0·52 atom in anisole at 18° C. A Kuhn-Roth estimation gave only 0·35 carbon-methyl groups, so that it is improbable that the substance contains such a grouping. It is not acted on by Malaprade's KIO_4 reagent (1934). Hence it cannot have a hydroxyl group attached to *either* of the carbon atoms adjacent to the CO group.

A solution of the acid, 0·71 g., in ethanol, 50 ml., was shaken in hydrogen with an active catalyst prepared from $PdCl_2$, 0·2 g., and norite, 0·5 g. Only 6·0 ml. of hydrogen were absorbed in 30 min. (calculated for uptake of 1 mol. of hydrogen, 110 ml.). Hence the acid does not contain a double bond.

Derivatives of the acid, $C_6H_8O_4$.—Identification as tetrahydro-γ-pyrone-2-carboxylic acid (structure 3).

(*a*) *2 : 4-Dinitrophenylhydrazone.*—Brady's reagent, 30 ml., was added to a solution of the acid, 0·10 g., in water, 2 ml. The resulting orange-yellow precipitate (0·15 g., MP 192° C.) was recrystallised from 80% aqueous ethanol. The dinitrophenylhydrazone was thus obtained as orange-yellow needles, MP 197° C. Found: C, 44·07; H, 3·93; N, 17·15%. $C_{12}H_{12}O_7N_4$ requires C, 44·42; H, 3·73; N, 17·26%.

(*b*) *p-Phenylphenacyl ester.*—The acid, 0·1084 g., was titrated with N/10 NaOH 7·44 ml. (equiv. 145·6). The solution was evaporated in vacuo to 2 ml. and the concentrate was heated with *p*-phenylphenacyl bromide, 0·2045 g., and ethanol, 8 ml. The crude reaction product, 0·16 g., was recrystallised from light petroleum (150 ml., BP 60–80° C.) and the ester was obtained as colourless shining plates (MP 139–140° C.). A mixture with authentic, synthetic, *p*-phenylphenacyl ester of tetrahydro-γ-pyrone-2-carboxylic acid (MP 139° C.) melted at 139·5° C. Found: C, 70·92, 71·20; H, 5·48, 5·66%. $C_{21}H_{18}O_5$ requires C, 71·01; H, 5·36%.

A mixture of the hydrolysis acid, $C_6H_8O_4$ (MP 121° C.) and authentic synthetic tetrahydro-γ-pyrone-2-carboxylic acid, purified by fractional sublimation in a high vacuum (MP 120° C.) melted at 120·5° C.

ACTION OF CONCENTRATED HYDRIODIC ACID ON PATULIN

(*a*) *Isolation of the reaction product.*—A mixture of patulin, 0·5 g. and conc. HI, 15 ml. (Δ, 1·7), was heated in a Zeisel apparatus in a stream of CO_2. The bath temperature was slowly raised during 1 hour to 130° C. and maintained at this temperature for a further ½ hour. The mixture was cooled, diluted with water and extracted 4 times with an equal volume of ether. The ether extract was washed with water and then with aqueous sodium thiosulphate and the ether was removed by evaporation. The crystalline residue, an iodo-acid, 0·55 g., was recrystallised from light petroleum (BP 60–80° C.), giving colourless, broad blades (MP 94° C.). Found: C, 28·77; H, 3·75; I, 49·85%. $C_6H_9O_5I$ requires C, 28·15; H, 3·54; I, 49·57%.

(*b*) *General properties of the iodo-acid.*—The iodo-acid does not contain a carbon-methyl group. Found: $-CH_3$, 0·8%. $C_6H_9O_5I$ requires for 1 carbon-methyl group, 5·87%. Perhaps the most striking property of the iodo-acid is the ease with which iodine is quantitatively eliminated as hydriodic acid in aqueous solution. This was demonstrated as follows:

The iodo-acid, 0·0980 g., was suspended in water and titrated with N/10 NaOH to phenolphthalein. The substance slowly dissolved, and at the point where all the substance had dissolved 5·00 ml. N/10 NaOH had been used. The substance continued slowly to neutralise more NaOH like a lactone. The final titration value after 3 hours (stable for 1 hour) was 7·63 ml. N/10 NaOH, giving an *apparent* equivalent of 128·4 (calculated for $C_6H_9O_5I$, titrating as a dibasic acid, 128·0).

The HI produced during the above reaction was estimated as follows:

The neutralised solution was acidified with N/10 H_2SO_4 (8 ml.) and extracted five times with ether (20 ml. each time). On removal of the ether an oil, 0·05 g., remained. The ether-extracted solution and washings were treated with $AgNO_3$ and the precipitated AgI was weighed. Wt. of AgI = 0·0889 g. = 49·03% I in the original reaction product. $C_6H_9O_5I$ requires 49·57% I.

(*c*) *Reduction of the iodo-acid with Zn and HCl: identification of γ-keto-n-hexanoic acid.*—A mixture of the iodo-acid, 0·5 g., zinc filings, 5 g., and 6 N HCl, 15 ml., was heated on the water bath for 1½ hours. A further 10 ml. of HCl was gradually added during the reduction. The residual zinc was separated by filtration and the clear colourless filtrate was mixed with Brady's reagent (2 : 4-dinitrophenylhydrazine in 2N. HCl; 200 ml.). The orange needles which quickly appeared were separated by filtration, washed with dilute HCl and water and dried (wt. = 0·29 g.; MP 190° C.). The crystals were recrystallised twice by dissolving in warm ethyl acetate and adding light petroleum, and were finally obtained as orange-yellow needles (MP 190° C.), not depressed on admixture with an authentic synthetic specimen of the 2 : 4-dinitrophenylhydrazone of γ-keto-*n*-hexanoic acid (MP 190° C.). Found: C, 46·97, 46·83; H, 4·71, 4·55; N, 17·8, 17·95%. $C_{12}H_{14}O_6N_4$ requires C, 46·45; H, 4·55; N, 18·05%.

The identity of the substance obtained by reducing the iodo-acid with Zn and HCl as γ-keto-*n*-hexanoic acid, $CH_3.CH_2.CO.CH_2.CH_2.COOH$, was confirmed by converting a specimen of it, which was isolated by ether extraction of a second reduction, into its *p*-phenylphenacyl ester. This derivative was crystallised from hot alcohol and was obtained as colourless needles (MP 79° C.), not depressed on admixture with an authentic synthetic specimen of the *p*-phenylphenacyl ester of γ-keto-*n*-hexanoic acid (MP 79° C.). Found: C, 73·50, 74·4; H, 6·23, 6·03%. $C_{24}H_{24}O_4$ requires C, 74·06; H, 6·22%.

(*d*) *Oxidation of the iodo-acid with $KMnO_4$: isolation of succinic acid and an acid $C_5H_{10}O_5$.*—The iodo-acid, 1·024 g., was suspended in N/10 NaOH, 80 ml., and shaken until dissolved. After standing overnight the theoretical amount of Ag_2SO_4 (0·6236 g.) was added and the precipitated AgI was removed by filtration. To the filtrate N/1 NaOH, 8·0 ml., and $KMnO_4$, 0·8428 g. (2 atoms of oxygen) were added at room temperature. After standing for a few hours the precipitated MnO_2 was separated by filtration. The solution required 6·60 ml. of N/1 H_2SO_4 for neutralisation. A further 12 ml. of N/1 H_2SO_4 was added and the volatile acids were removed by evaporation to dryness in vacuo. The solid residue was extracted with ether, and by graded addition of light petroleum to the ether extract two crystalline fractions were obtained.

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Fraction 1.—After purification this fraction (wt. 0·04 g.) finally melted at 186° C., not depressed on admixture with authentic succinic acid (MP 186° C.). Found: C, 40·76, 40·74; H, 5·19, 5·14%. Calc. for $C_4H_6O_4$; C, 40·67; H, 5·12%.

Fraction 2.—Wt. 0·09 g. after purification. This fraction, which separated in the earlier fractions as colourless prisms or plates, melted at 102° C., raised to 104° C. by sublimation in a high vacuum. Found: C, 44·08, 44·06; H, 6·08, 5·87%. Equivalent, by titration, 167. $C_6H_{10}O_4$ requires C, 44·44; H, 6·22%. Equivalent, titrating as a monobasic acid, 162. This acid has evidently arisen by the reaction -CH = CH- → -CHOH-CHOH-. Further evidence of the presence of a double bond and of its position relative to the CO group in the hydrolysis product arising by the action of water on the iodo-acid is afforded by the action of phenylhydrazine.

(*e*) *Action of phenylhydrazine on the iodo-acid in presence of water.*—The iodo-acid, 0·2 g., was treated with a filtered solution of phenylhydrazine hydrochloride, 0·4 g., in water, 10 ml. containing crystalline sodium acetate, 0·8 g. Colourless needles (0·04 g.; MP 104° C.) separated, which on recrystallisation from hot water were obtained in very long slender needles (MP 105° C.). Found: C, 65·83; H, 6·33; N, 12·95%. $C_{12}H_{14}O_2N_2$ requires C, 66·03; H, 6·46; N, 12·83%. This derivative is a substituted pyrazoline since it gives an intense purple colour with Knorr's reagent (conc. H_2SO_4 and $K_2Cr_2O_7$). Hence the parent substance $C_6H_8O_2$ from which it arises contains the grouping -CH = CH-CO-. It is clear therefore from the evidence in sections *b*, *c*, *d* and *e* that the acid obtained by the action of water on the iodo-acid has the constitution, CH_2 = CH.CO.CH_2CH_2.COOH.

(*f*) *Condensation of the iodo-acid with malonic ester.*—The iodo-acid, 3·0 g., was esterified with a slight excess of ethereal diazomethane. There was a vigorous evolution of nitrogen. The ether was evaporated and the residual iodo-ester was used for the condensation.

Metallic sodium, 0·27 g., was dissolved in ethanol, 5 ml., and the solution was treated with diethyl malonate, 1·88 g. After 20 minutes the iodo-ester was added and the mixture was heated on the boiling water bath for 2 hours. The reaction product, 2·91 g., was extracted with ether and distilled in vacuo. The main fraction (1·03 g.; BP 160–164° C./1 mm.) was hydrolysed by boiling under reflux with conc. HCl, 2 ml., for 9 hours. The water and HCl were removed in vacuo and the residual crude solid was crystallised from ether (wt. 0·51 g.) and purified for analysis by sublimation in a high vacuum. Colourless, clusters of plates, MP 133° C. Found: C, 51·21; H, 6·33; C-methyl, 0·54%. $C_8H_{12}O_5$ requires C, 51·05; H, 6·43; for 1 C-methyl group, 8·0%. Since this acid does not contain a carbon-methyl group the position of the iodine atom in the original iodo-acid is fixed as on the terminal carbon atom. The iodo-acid therefore has the structure $CH_2I.CH_2.CO.CH_2.CH_2COOH$ and is γ-keto-ε-iodo-*n*-hexanoic acid. The condensation product above, $C_8H_{12}O_5$, is γ-ketosuberic acid, $HOOC.CH_2.CH_2.CH_2.CO.CH_2.CH_2.COOH$.

CATALYTIC HYDROGENATION OF PATULIN

(*a*) *With palladium-norite-catalyst: uptake of 2 atoms of hydrogen.*—A solution of patulin, 12 g., in ethanol, 100 ml., was hydrogenated at ordinary pressure in the presence of a palladium-norite catalyst prepared from 0·5 g. of $PdCl_2$; 1690 ml. of hydrogen (corr.) was absorbed in the first half hour and the hydrogenation was stopped after a total uptake of 1924 ml. H_2 (corr.). (Theoretical for uptake of 2 atoms of hydrogen per mol. of patulin, 1745 ml.). The catalyst was removed by filtration and the alcohol removed in vacuo. A colourless, water soluble oil (12·6 g.) remained which did not crystallise. A solution of this oil, 0·4 g., in water, 50 ml., was treated with Brady's reagent, 100 ml. A heavy precipitate rapidly formed (wt. 0·50 g.). It was crystallised from ethanol and then methanol and was obtained as orange flattened needles (MP 201° C.). Found after drying in high vac. at 110° C.: C, 45·90; H, 3·57; N, 16·41%. $C_{12}H_{12}O_7N_4$ requires C, 46·43; H, 3·60; N, 16·66%. This compound is thus the 2 : 4-dinitrophenylhydrazone of dihydro-patulin, $C_7H_8O_4$, from which it follows that patulin itself contains at least one double bond which can be saturated by catalytic hydrogenation (1 mol. H_2).

(*b*) *With palladium-norite-catalyst: uptake of 4 atoms of hydrogen.*—A solution of patulin, 0·5 g., in ethanol, 8 ml., was hydrogenated at ordinary pressure with a palladium-norite catalyst prepared from $PdCl_2$, 0·2 g., and norite, 0·5 g.; 137·7 ml. H_2 (uncorr.) was absorbed in the first 10 minutes and a total of 160·9 ml. H_2 (corr.) in 20 minutes, when uptake was negligible and the experiment was terminated. (Theoretical for uptake of 4 atoms of hydrogen per mol. of patulin = 145·5 ml.). After removal of catalyst and solvent a colourless syrup (0·51 g.) remained which could not be induced to crystallise. An aqueous solution of the syrup gave only a trace of precipitate with Brady's reagent. It is therefore probable that uptake of 4 atoms of hydrogen per mol. of patulin under the above conditions leads to the saturation of one double bond (i.e., -CH = CH- to $-CH_2.CH_2$-) and reduction of the carbonyl group = CO to -CHOH-.

(*c*) *With Adams's platinic oxide catalyst: uptake of 4 atoms of hydrogen.*—A solution of patulin, 5·0 g., in ethanol, 75 ml., was hydrogenated at ordinary pressure with Adams's PtO_2 catalyst, 0·2 g. (Voorhees and Adams 1922; Gilman 1932, p. 452). When no further uptake of hydrogen was observed a further 0·2 g. of catalyst was added and the hydrogenation was continued. The total uptake of H_2 at N.T.P. was 1580 ml., without correction for the hydrogen absorbed by the PtO_2; theoretical for uptake of 4 atoms of hydrogen = 1455 ml. The deep red solution thus obtained was shaken with air to coagulate the Pt, filtered and the alcohol was removed in vacuo. The product was a dark red oil (wt., 5·60g.) which reacted acid to litmus.

(*d*) *Reduction of the PtO_2 hydrogenation product with HI and red phosphorus: identification of β-methylcaprolactone and β-methylcaproic acid.*—A mixture of the above oil, 5·60 g., hydriodic acid (Δ, 1·7), 50 ml., and red phosphorus, 2·5 g., was heated under reflux for 3 hours at a bath temperature of 150–160° C. After cooling the mixture, it was diluted with water and extracted with ether, the free iodine being removed from the ether by shaking with aqueous thiosulphate. On removal of the solvent a clear red oil (3·74 g.) remained. This was heated for 45 minutes under reflux with zinc, 20 g., and 6N, HCl, 50 ml., to remove combined iodine, and then re-extracted with ether. The ether solution contained a mixture of neutral substances, lactones and free acids. These were separated by the usual methods (see Birkinshaw, Oxford and Raistrick 1936) and gave the following fractions:

(1) *Neutral substances.*—0·03 g. of oil which was not examined further.

(2) *Lactones.*—Wt. 0·56 g. This fraction was converted into the phenylhydrazide as follows. A solution of it in ethanol, 2 ml., and phenylhydrazine, 0·56 g., was heated on the boiling-water bath for 2 hours. After cooling, ether was added and the solution was chilled. A crystalline product (wt. 0·12 g.; MP 142–144° C.) separated and a further crop (wt. 0·18 g.; MP 128–132° C.) was obtained from the mother liquors by evaporation to dryness and extraction of impurities with ether. The crude material was crystallised several times from ethanol to give finally colourless glistening plates, MP 152° C., not depressed on admixture with the phenylhydrazide prepared from synthetic β-methylcaprolactone (see section *e* below). Found: C, 66·49; H, 8·45; N, 12.45; C-methyl, 8·05%. $C_{13}H_{18}O_2N_2$ requires C, 66·07; H, 8·53; N, 11·86; for 1 C-methyl 6·36%, for 2 C-methyl, 12·72%.

(3) *Free acids.*—This fraction was distilled in steam. The distillate required 1·75 ml. N. NaOH for neutralisation to phenolphthalein. The neutralised distillate was evaporated to 2·0 ml. and the concentrate was heated with *p*-phenylphenacyl bromide, 0·48 g., and ethanol, 8 ml. There was isolated from the reaction mixture, as the main fraction, a crystalline solid (wt. 0·16 g., MP 48–51° C.). Recrystallisation from light petroleum gave colourless plates (wt. 0·09 g., MP 51–51·5° C.). A mixture of this substance with authentic synthetic β-methylcaproic acid *p*-phenylphenacyl ester (MP 52–52·5° C.) melted at 51–52° C. Found: on the degradation product C, 77·41; H, 7·37%. $C_{21}H_{24}O_3$ requires C, 77·75; H, 7·46%. (The MP of β-methylcaproic acid phenylphenacyl ester is given by Quebedeaux and others (1943), probably in error, as 61–62° C.).

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(e) *Synthesis of the phenylhydrazide of β-methyl-γ-hydroxy-n-hexanoic acid.*—α-Bromodiethylketone (33 g.; Pauly 1901) was condensed with sodium malonic ester; prepared by dissolving metallic sodium, 4·6 g., in ethanol, 50 ml., and adding diethyl malonate, 32 g. The resulting condensation product, diethyl β-propionyl-ethyl malonate, was isolated from the reaction mixture in the usual manner and was obtained as an almost colourless oil (wt. 14·9 g., BP 115–118° C./3 mm.).

This ester was hydrolysed, and decarboxylated to the corresponding keto acid, by boiling it with 2 N. H_2SO_4, 150 ml., for 43 hours, when CO_2 evolution ceased. The cooled reaction mixture was extracted with ether and the acid was transferred to sodium carbonate solution. It was liberated by HCl and again extracted with ether. On removal of the solvent, β-methyl-γ-keto-n-hexanoic acid remained as a pale yellow oil, wt. 6·6 g.

This keto acid was now reduced to the corresponding hydroxy acid. It was dissolved in ethanol, 50 ml., and to the boiling solution metallic sodium, 11·6 g., was added during 10 minutes. Then 95 ml. of ethanol was gradually added so as to dissolve the remainder of the sodium in ½ hour. The cooled reaction mixture was diluted with water, 100 ml., the ethanol removed in vacuo and the residue acidified with 46 ml. of a mixture of conc. H_2SO_4, 50 g., and water, 50 ml. The acidified mixture was boiled for 5 minutes, cooled and extracted with ether. The ether extract was washed with aqueous sodium carbonate. On removal of the solvent there remained 5·61 g. of an oil, fractional distillation of which gave 3·51 g. of the lactone of β-methyl-γ-hydroxy-n-hexanoic-acid—i.e., β-methyl caprolactone as a colourless oil (BP 225–230° C./762 mm.).

A mixture of this lactone, 1 ml., phenylhydrazine, 1 ml., and ethanol, 4 ml., was refluxed for 2 hours. The resulting phenylhydrazide was isolated and purified as described above under section (*d*) 2 lactones, and the phenylhydrazide of β-methyl-γ-hydroxy-n-hexanoic acid was thus obtained as colourless glistening plates, MP 151° C., alone or in admixture with the phenylhydrazide obtained by the degradation of patulin. Found: C, 65·04, 65·79; H, 8·49, 8·52; N, 12·0, 11·9%. $C_{12}H_{20}O_2N_2$ requires C, 66·07; H, 8·53; N, 11·86%.

We wish to thank the Therapeutic Research Corporation of Great Britain for providing a number of synthetic reference samples which were of great value in identifying breakdown products of patulin. We have had many helpful discussions during the course of the work with the research staffs of the Corporation. One of us (S. E. M.) is indebted to the Corporation for a grant which has enabled him to take part in the work.

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III. Preliminary Trial in the Common Cold

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The observations made in this laboratory with patulin, which was originally supplied by Professor Raistrick for chemotherapeutic tests in cancer, were uncontrolled and are therefore of no solid scientific value, but since they formed the starting-point of Commander Hopkins's investigation it may be of some interest to add a note to this report.

When the supply of patulin was received I was in the second stage of a severe common cold which had kept me indoors for two days. A watery solution of unknown strength, but probably, judging by subsequent tests, at least 1 in 1000, was prepared and the nasal passages were thoroughly douched with it. The douching caused some pain, but since it was followed within an hour by a clearing of the nasal passages it was repeated twice with solutions of about a tenth the original strength. The third and last application of patulin was made about 9 PM. A night of undisturbed rest, the first for three days, was obtained and next morning I was completely well and back at work.

Experiments were next made to determine the strength of solution which does not cause an appreciable amount of pain after nasal douching; 1 in 20,000 is practically painless and solutions of this strength buffered with phosphate at pH 6·0, were prepared and offered to medical and non-medical friends for trial. The results obtained cannot be set down in exact form but most of the reports were sufficiently favourable to warrant a real trial under carefully controlled conditions.

Medical friends who used the solution provided, as would be expected, most useful information. One volunteer, Dr. A. P., treated what appeared to be a febrile cold which was later diagnosed as influenza; patulin did not reduce the temperature or shorten the duration of the disease but it did prevent the nasal symptoms and signs of the common cold which so often confuse the diagnosis of true influenza. Another medical friend, Dr. B. P., treated his cold and at once obtained alleviation; running at the nose started again next morning and was again checked. This continued for several days when it became obvious that the antra were full of pus. The antra were washed out and the patient had no further trouble.

Many people regard the common cold as an annoying inevitable minor illness suitably treated with contempt; those few who are subject to frequent attacks, each of which lasts several weeks and makes life a misery, do not take such a light-hearted view. The following notes have been provided by Dr. B. D. P., who suffers severely and frequently:

Nov. 20–24, 1942. Kept indoors with a violent infectious cold. Nasal passages blocked. No pus. Violent sneezing. Nights disturbed.

Nov. 24. Forenoon: nose running. Neuralgic pains in bones of face. No fever but feeling miserable. At 12.15 PM, gargled and douched nasal passages with solution of patulin. Nasal passages cleared almost immediately. Gargling and douching repeated at 2.15, 4.45 and 9.15 PM. Slept nearly 10 hours breathing freely.

Nov. 25. Woke with nasal passages clear and dry. No cough. Slight huskiness of voice. Gargled and douched at 7.30 AM. No further treatment. Returned to work.

A sapper, RE, had a severe cold of 2 days' duration. His nasal passages were douched with a freshly prepared solution of a strength of 1 in 5000; the douching was repeated twice, the last time at 10 PM. Relief from the nasal stoppage and associated symptoms was quickly obtained and a good night's rest followed. Next day the cold was better and no further treatment was needed.

These are the strikingly successful results. Of professional observers, one only, Dr. I. M., reported no improvement at all.

The reports received from non-medical friends were not sufficiently exact either as to duration of illness, symptoms or effects of treatment to enable one to reach any conclusions. Several found nasal douching difficult or too much bother to carry out and consequently treatment in these cases was perfunctory; others appeared to exaggerate the beneficial effects. On balance it appeared that freshly prepared solutions of 1 in 5000 to 1 in 10,000 give a good chance of rapid amelioration of symptoms or even of a quick cure; with weaker and old solutions the chances of alleviation diminish.

Postscript.—Since the note above was written an opportunity to treat a cold from the beginning has occurred.

The cold started in the early hours of the morning with sneezing, headache and a hot running nose. The first treatment was made at 11 AM the same day; the nasal passages cleared rapidly and the watery discharge ceased. At 5 PM all the signs of a cold returned and treatment was renewed. Again relief was obtained but at 10 PM nasal discharge of clear fluid began again. Treatment before retiring to bed

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gave a good night's rest but symptoms returned next morning. During the second day nasal douching was carried out three times, but in spite of immediate relief to nasal blockage the cold was not cured. On the afternoon of the third day the cold finally cleared up. On the evening of the third day one small fleck of green pus was obtained by blowing the nose.

Thus the cold was not cured in the early stages but relief from nasal stoppage was obtained; this early period of a cold may be the period of virus infection and if it is it may be said from this closely observed case that patulin has no effect on the virus. The secondary stage of infection with gram-positive and gram-negative organisms was completely prevented and since it is an almost invariable rule that the purulent process continues with me for at least a week, patulin proved to be of great value.

IV. Biological Properties; Extended Trial in the Common Cold

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Preliminary experiments have been carried out to estimate the action in vitro of patulin against a number of the more common pathogenic aerobic organisms. For the reasons put forward by Fleming (1938) the bacteriostatic power of the drug has been estimated rather than its bactericidal action. In order that the results might be comparable with those obtained with other mould products the method adopted was, in the main, the serial dilutional technique used by Oxford (1942) in a similar investigation.

Serial dilutional method.—Standard heart broth at pH 7·2 containing 2% glucose, 1% peptone and 0·5% NaCl was used as the basal medium. The solution of patulin was prepared by weighing 25 mg. of the substance into a 100 c.cm. flask, adding 90 c.cm. of sterile distilled water and dissolving by gentle warming. The resulting solution was then quickly brought to boiling-point, cooled rapidly and brought up to the 100 c.cm. mark with sterile water. This gives a 1 : 4000 solution of patulin. The sterile basal medium was tubed in 4 c.cm. quantities and to each tube was added graded dilutions of patulin—e.g., 1 c.cm. of 1 : 4000 solution added to 4 c.cm. of medium gives a 1 : 20,000 dilution; 0·8 c.cm. of 1 : 4000 solution plus 0·2 c.cm. of sterile water a 1 : 25,000 dilution, and so on, using increasing quantities of sterile water and decreasing quantities of patulin solution. Thus each tube contained 5 c.cm. of liquid, 1 c.cm. of sterile water being added to the control tube. Different strengths of patulin solution were prepared as the work proceeded and they became necessary.

Both cultures obtained from the National Collection of Type Cultures and organisms isolated in the laboratory where the investigation was carried out were used for testing. In the former case three successive generations (each of 24 hours) were grown in the basal medium before the test was carried out.

The tubes containing the sterile basal medium plus the dilutions of patulin were inoculated from glucose-broth cultures of the test organisms, a standard loopful (0·004 c.cm.) to each. Except in the case of weakly growing organisms all cultures were diluted 1 in 1000 in the sterile basal medium before use. After sowing, the cultures were incubated for 24 hours at 37° C. and were then examined. Complete inhibition of growth was shown by the absence of any turbidity, partial inhibition by a growth which was obviously less than that in the control tube.

All tests were carried out in duplicate and have been repeated using different samples of patulin.

Experimental Findings

From table I it will be seen that patulin possesses bacteriostatic powers against a number of gram-positive and gram-negative aerobic organisms. The position with regard to the anaerobes is still under investigation but preliminary results show that the substance is active against this group also.

Compared with other mould products which have been isolated during recent years, patulin differs from penicillin, gramicidin and citrinin in that it shows no selective differentiation between gram-positive and gram-negative microbes. In this respect the drug is comparable with penicillic acid, and indeed the inhibitory figures published for the latter compound (Oxford 1942) are very similar to those shown in table I. Patulin is very much less active than is penicillin against gram-positive organisms, but the position is reversed with regard to the coli-typhoid salmonella group. For example, while patulin gives complete inhibition of *Salmonella typhi* at a dilution of 1 in 50,000, and complete inhibition of *Bacterium coli* at a dilution of 1 in 33,000, the figures for penicillin (Abraham et al. 1941) are 1 in 10,000 and less than 1 in 1000 respectively. In the same way, with the dysentery group patulin is a more efficient growth inhibitor than penicillin, the figures for *Bact. dysenteriæ* Shiga being 1 in 50,000 for the former drug and 1 in 20,000 (Abraham et al. 1941) for the latter.

Effect of serum.—In order to estimate the inhibitory effect, if any, of serum the dilution tests were repeated with the addition of 10% fresh human serum. *Staphylococcus aureus*, *Streptococcus pyogenes* and *Strep. pneumoniæ* were used as test organisms and the results obtained are shown in table II. In no instance was any inactivation observed.

Effect of pus.—In view of the projected trials of the substance in the treatment of common cold, it was important that its activity in the presence of pus should be estimated. This was carried out using "pus broth" as described by Florey and his colleagues (1941), and with *Staph. aureus*, *Strep. pyogenes* and *Strep. pneumoniæ* as test organisms.

The pus was first "thinned" by incubation at 37° C. for 3 days, and after centrifugalisation one part of the supernatant fluid was diluted with two parts of broth to give a 33% pus broth. After filtration through a Seitz EK filter

TABLE I—BACTERIOSTATIC ACTION OF PATULIN USING 2% GLUCOSE BROTH

Test organism	Limiting dilution for inhibition			Notes
	Complete	Partial	None	
Staph. aureus ..	50,000	..	80,000	Coag. + ve from abscess
Ditto ..	33,000	..	50,000	Coag. + ve from osteomyelitis
Ditto ..	33,000	50,000	100,000	Two strains: NCTC 3095 and 3750
Ditto ..	50,000	..	100,000	NCTC 3761
Strep. pyogenes	80,000	..	100,000	Lancefield A from throat
Ditto ..	33,000	50,000	80,000	NCTC 2432
Strep. viridans ..	33,000	..	50,000	NCTC 3166
Strep. pneumoniæ	80,000	..	100,000	Group 3
S. typhi ..	50,000	..	80,000	..
Ditto ..	50,000	..	80,000	NCTC 2128
S. typhi. para A	80,000	100,000	150,000	..
S. typhi. para B	50,000	..	80,000	..
Ditto ..	33,000	..	50,000	NCTC 14
Bact. coli ..	33,000	50,000	80,000	NCTC 86
B. dysenteriæ Flexner	80,000	..	100,000	..
B. dysenteriæ Shiga	50,000	80,000	100,000	..
B. proteus ..	33,000	50,000	80,000	NCTC 401
M. catarrhalis ..	80,000	100,000	150,000	..

varying dilutions of patulin were added to this broth, which was then inoculated in the usual way with the test organisms, incubated for 24 hours at 37° C. and examined. Pus broth without the addition of patulin was used as a control and the test was carried out in parallel with 2% glucose broth.

The results in table II show that in no instance was any antagonistic effect observed.

Effect on leucocytes.—The in-vitro effect of patulin on the phagocytic activity of leucocytes has been tested using the method described by Thrower and Valentine (1943).

Saline dilutions of the drug were prepared ranging from 0·4% to 0·0125%; 0·2 c.cm. of each dilution was added to an equal volume of reconstituted blood and the tubes were incubated at 37° C. for 3 hours. A tube containing saline

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TABLE II—DILUTION TESTS, SHOWING THAT SERUM AND PUS DO NOT INTERFERE WITH BACTERIOSTATIC EFFECT OF PATULIN

Test organism	Highest dilution producing complete inhibition		
	2% glucose broth	Glucose broth +10% serum	Pus broth
Staph. aureus ..	33,000	33,000	33,000
Strep. pyogenes ..	80,000	80,000	80,000
Strep. pneumoniæ ..	80,000	80,000	80,000

without the addition of the drug was used as the control. After 3 hours incubation a standard drop of heat-killed three-hour staphylococcal broth culture was added to each tube; the tubes were then shaken and incubated for 30 minutes. After incubation, films were made from each tube and a count was made, noting (*a*) the number of cells containing cocci and (*b*) the number of ingested cocci in 100 phagocytes.

The results showed that at 0·05% of patulin phagocytosis is inhibited; it is reduced at 0·025% but unaffected at 0·0125%.

Acute toxicity for laboratory animals.—Patulin has been administered intravenously to mice weighing between 20 and 25 g.; the results are set out in table III. Deaths occurring within 3 days were recorded. The average lethal dose is in the region of 0·5 mg. per 20 g. With the higher dosage levels (1 mg. and 1·5 mg. per 20 g.) most of the animals appeared ill within 2 hours of the injection and died within 6 hours. In a number of instances death was immediately preceded by convulsions; in one case so severe as to fracture vertebræ. On autopsy the lungs were found to be œdematous and

TABLE III—DETERMINATION OF LETHAL DOSE IN MICE

Intravenous dose (mg./20 g.)	No. of mice	Deaths within 3 days	Mortality %
0·25	30	5	16·6
0·5	20	13	65
1·0	20	17	85
1·5	5	5	100

grossly hæmorrhagic. On section the capillaries showed acute dilatation and the alveoli were packed with red cells. Similar capillary damage, but to a less degree, was seen in the liver, spleen and kidneys. Histological examination of the brain showed œdema, congestion of the vessels and a round-cell infiltration.

The average lethal dose for a 20 g. mouse when the substance is administered subcutaneously is also in the region of 0·5 mg. When this amount is given dissolved in 0·2 c.cm. of water death usually takes place within 24 hours. Changes similar to those described when the intravenous route was used were found on autopsy. With smaller doses (0·25 mg. and 0·125 mg.) the mice survived but injection was followed first by œdema of the tissues and later by necrosis at the site of inoculation.

The findings in a rabbit are very similar. After an intravenous injection of 50 mg. (0·25 mg. per 20 g. body-weight) the animal went into convulsions and died at 14 hours. At autopsy, pleural and pericardial effusions were present and the organs showed the same changes as in the mice.

Treatment of the Common Cold

All epidemiological studies on the common cold go to show that the disease is prevalent throughout the world and that it is a very important factor in the morbidity-rate. In the United Kingdom the complaint is responsible for more absenteeism and loss of efficiency than any other disorder or group of disorders. Although a cold is usually regarded as a nuisance rather than a serious complaint, there can be no doubt that repeated attacks (and the average incidence is two attacks per person per annum) lead to serious and sometimes disabling complications.

For years past a cure for the common cold has been sought, and numerous so-called specifics have had their advocates. None of these specifics, however, has fulfilled its early promise, and, as the saying goes, if a cold is treated energetically it will get well in seven days, while if left to itself it will get well in a week.

When patulin was isolated and preliminary tests in vitro had shown that it possessed bacteriostatic powers against a number of gram-positive and gram-negative organisms, a few observers decided to give the drug a personal trial in the treatment of common cold. The results were encouraging and it was felt that the substance merited further trial in a larger group, under controlled conditions. An investigation was therefore arranged in coöperation with the authorities at a large naval depot.

Common cold is a generic term applied to a number of conditions affecting the respiratory tract, and it was essential for an investigation such as this that some limited definition of a cold would have to be adopted and that only those cases which conformed to that definition should be included in the series. The definition adopted was in the main that of Horder (1932)—an acute specific catarrh involving the upper respiratory tract, and in most cases the nose and pharynx. A cold runs a benign course of 3–10 days, with pyrexia and constitutional disturbance. Horder allows some degree of sinusitis, laryngitis or tracheitis in his definition, but patients presenting themselves with such complications on first attendance were not included in this series. Moreover, patients with severe headache, body aches, and in whom the diagnosis between influenza and common cold was indefinite were excluded. Thus the type of case treated was an acute or subacute rhinitis with or without pharyngitis, and with or without slight pyrexia and constitutional disturbance—in other words, what the man in the street, who may be sneezing, with his nose "stuffed up" or running and a dry throat, and is feeling thoroughly miserable, calls a "cold in the head."

The investigation was carried out in two parts:

Group 1.—A controlled series in which half the patients were treated with patulin and half with a control fluid.

Group 2.—In which selected observers suffering from colds were given supplies of patulin and asked to keep careful notes of their progress.

PREPARATION AND ADMINISTRATION

Patulin keeps well in a phosphate buffer solution adjusted to pH 6. This buffer solution is prepared as follows:

27·231 g. acid potassium phosphate ('Analar') is dissolved in a litre of distilled water; 57 c.cm. of N/10 sodium hydroxide is added to 250 c.cm. of the phosphate solution; the resulting solution is well mixed and then made up to a litre with distilled water.

The stock solution of patulin is prepared by dissolving 0·050 g. of the substance in 5 c.cm. of the buffer solution and diluting to 100 c.cm. with sterile distilled water. This stock solution keeps well; a supply which was kept for 3 months showed no evidence of deterioration. For ready use one part of the stock solution is diluted with nine parts of sterile distilled water to give a 1 : 20,000 solution of substance; two parts with eight parts of water to give a 1 : 10,000 solution, and so on. The solutions for use were prepared freshly each day and were used within twenty-four hours. The strengths used were 1 : 20,000 in the first batch, 1 : 10,000 in the second, and 1 : 5000 in the third batch. In group 2 a 1 : 10,000 solution was supplied.

The solution of patulin was applied locally to the nasal passages and nasopharynx. Patients in group 1 were treated by a sick-berth attendant who sprayed the nose and throat with a De Vilbiss atomiser. Patients in group 2 either sniffed it up from the palm of the hand or instilled it into the anterior nares with a pipette; some of the patients in this group also gargled with the solution. The patients in group 1 were treated every 4 hours. Some of the patients in group 2 applied the treatment every 2 hours, others every 4 hours. Approximately 4 c.cm. of fluid was used on each occasion, and in most cases treatment was continued for 24–48 hours. A few patients in the first batch were treated for three days, but in the later batches 48 hours was taken as the limit. The control fluid used in group 1 was equally diluted buffer solution.

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RESULTS IN GROUP 1

Treatment of group 1, which was subdivided into three batches, was carried out at a Naval depot. Colds were rife at the time, and after a broadcast on the subject ample volunteers were forthcoming. The patients were first examined and the form here illustrated was filled up; if they conformed to the definition of common cold they were then directed to an attendant who treated alternate cases with a solution of patulin and the remainder with the control fluid.

Date / /43. Name_____ Age_____ Rating_____

Headache_____ Shivering_____ Coryza_____

Body pains_____ Sore Throat_____ Cough_____

Other symptoms_____

Contact?_____ Subject to colds?_____

Present condition:— T. P. R.

Eyes_____ Nose_____

Fauces_____

Chest_____

Date.	Time.	Treatment.	Progress.

Duration of symptoms before treatment_____

Duration of symptoms after treatment_____

COMMENTS:—

Form used in Group I. The reverse has space for the findings on direct examination and culture of the nasopharyngeal swab.

The patients themselves did not know that the series was being controlled and were under the impression that they all had had the same treatment. With the third batch, to prevent the possibility of any bias on the part of those conducting the trials, until the results of treatment had been assessed, none of them knew which was the treated group and which the control.

Treatment was repeated four-hourly during the day, and the patients were seen at the end of 24 hours and again at the end of 48 hours, at which times improvement or otherwise was assessed. The assessment of results was by no means easy, for a cold, apart from rhinorrhœa, has but few objective signs, and one was forced to rely largely on the patient's statement. However, every effort was made to check a patient's statement that he was cured by physical examination and by interrogation as to why he had said so.

As might be expected, a certain number of men, both treated and controls, had made up their minds that they were going to be cured, and claimed complete alleviation of their symptoms when asked how they felt. Further questioning in such cases elicited the fact that although they felt better they were still suffering from such symptoms as some nasal discharge, a stuffed-up nose in the morning, &c. Only those men who, after questioning, were found to be completely symptom-free, and who, on examination, had no objective signs were classified as cures. In the first batch an attempt was made to divide the patients into three groups; cured, improved and worse, but because of the difficulty in assessing improvement this method was abandoned, and patients in the subsequent groups were classified as cured or not cured. For convenience in statistical analysis, the figures obtained in the first batch have been treated in a similar fashion, the improved and worse cases being classified as "not cured." The results obtained are shown in table IV; it will be seen that in each batch the treated patients show a much higher percentage of cures than do the controls.

A large number of the cured patients noticed a great improvement after the first application of patulin, and were completely cured within 24 hours. The response to treatment could almost be described as dramatic; men who had been feeling miserable with a constant nasal discharge and a raw throat during the day and a stuffed-up nose on waking in the morning, reported 24 hours after treatment had been begun that they felt quite fit and that their nasal passages were dry and clear.

Other patients improved more gradually, but experience showed that if complete cure did not take place within 48 hours it was unlikely that patulin would have any apparent effect on modifying the course of the cold.

No ill effects were observed after treatment. Some patients (especially those in batch 3, when a 1:5000 solution was used) complained of a transitory stinging in the nose, immediately after they had been sprayed, and a number noticed that for about half an hour after treatment they had a profuse nasal discharge. That these effects were not due either to the buffer solution or to mechanical action is shown by the fact that none of the patients in the control group reported similar symptoms.

The failures may be divided into two groups—(*a*) patients who did not improve in any way, and (*b*) patients who showed transitory improvement which was not maintained or in whom complications developed. The second group is of some interest and mention may be made here of a relevant personal experience.

For many years I have had at least one severe cold each winter. These attacks may be described as typical common colds; they start with vague malaise, a dry throat and slight pyrexia and are closely followed by sneezing, profuse nasal discharge and completely blocked nasal passages on waking in the morning. The acute symptoms usually persist for 4–5 days and are followed by a purulent nasal discharge which lasts for about a week. A few years ago one of these attacks culminated in a severe pan-sinusitis, which, however, cleared up with conservative treatment. During the time that patulin was undergoing clinical trials I noticed the premonitory symptoms of a cold, and 12 hours later when the attack had fully developed I started treatment using a 1:10,000 solution of patulin every 4 hours. Next morning—i.e., some 20 hours later—I woke up feeling completely cured and without a trace of nasal discharge or blockage of the nasal passages. The same night, however, symptoms of sinusitis (pyrexia, pain close to the inner canthus of the eye, together with generalised headache and vomiting) made their appearance.

TABLE IV—RESULTS IN GROUP I

Batch and month	TREATED			CONTROLS		
	Patients	Recovered	% recovered	Patients	Recovered	% recovered
1. January	54	24	44	41	1	2·4
2. February	23	16	70	26	3	12
3. April	18	15	83	18	4	22
Total	95	55	58	85	8	9·4

Two of my colleagues had similar experiences; after the use of patulin they noticed distinct but temporary improvement, but shortly afterwards both developed sinusitis; like myself, both had had previous attacks. It is probable that any focus which the solution cannot reach will keep the infection active in the nasal passages, and some of the failures in the treated group may have been due to the existence of a previous sinusitis. In 2 patients clinical and radiological evidence of such a condition was found; neither of these patients improved, but neither became worse nor complained of symptoms suggestive of an acute sinusitis.

RESULTS IN GROUP 2

Some 14 patients complaining of colds were given supplies of patulin and asked to keep notes of their progress. Of these, 10 reported a complete and rapid recovery. Of the remainder, one felt much better and 3 noticed no improvement whatsoever. Typical case-histories of the cured cases are as follows.

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CASE 1. (Notes supplied by Dr. M. Maizels.)—A married woman, who usually has two bad winter colds, which always develop in the same way: thickness in nose, running eyes, sore throat. The cold is bad for 3 days and clears up in about 3–4 days. On the evening of Feb. 2 she noticed dryness and stuffiness of the nose and sore throat. Next morning she felt she had a very heavy cold coming—sneezing, fullness in ears, serous discharge from nose, eyes watering and throat dry at the back, but felt well in herself. She feels sure that this would have developed typically without treatment. Treatment began at 12 noon on Feb. 3; patulin was instilled as drops in the nose and snuffed up from the hand; the throat was gargled with patulin. Snuffing and gargling were repeated at 2.15, 4.15 and 6.15 PM on Feb. 3 and on the morning of Feb. 4. At 5 PM on Feb. 3, the patient said, her nose was streaming and the cold was getting worse. She woke up on Feb. 4 quite well.

CASE 2.—A man, who reported with a "streaming cold" of one day's duration. The predominating symptoms were malaise, headache, profuse nasal discharge and sore throat. Examination revealed a subfebrile temperature, slight faucial inflammation and acute rhinitis. Treatment consisted of 1 : 10,000 patulin every 4 hours during the day, and 24 hours after beginning treatment the patient reported that he was completely symptom-free. This was confirmed by examination. As a sufferer from colds he was convinced that his cold would have dragged on for a week or longer had he not been treated.

CASE 3.—A man, who reported with a heavy cold of several days duration. The predominating symptoms were a thick purulent nasal discharge during the day and completely blocked nasal passages, together with a sore throat, on waking in the morning. Treatment consisted of 1 : 10,000 patulin every 4 hours during the day. After the first application the discharges became very profuse and watery; 48 hours later all discharge had ceased and the nasal passages were clear and dry.

In addition to these cases, 27 WRNS personnel were treated with patulin. The results are given in the following report by the officer in charge of the trials.

"The first bottle of the substance was provided for my office staff and myself to try. The results were so successful that other officers asked to be allowed to use it, and have sent their ratings for treatment. As far as possible we have used it, as instructed, before a cold has lasted more than 24 hours

"Twelve officers and 14 ratings have reported completely successful results after not more than 24 hours' treatment. Included among these was a girl motor-transport driver who has had a series of very heavy colds; not a single attack has developed since she has used the solution. One officer and one rating reported partially successful results. Both of these are subject to colds which seem deep-rooted and last for 2–3 weeks. Both reported that the treatment gave them considerable relief and made them feel much less heavy headed, but the cold itself did not clear up immediately. The one real failure was in an officer who gets very heavy colds, accompanied by aches and pains and usually a rise in temperature. It did not seem to have any definite effect in her case."

BACTERIOLOGY

The bacterial flora of the nasopharynx was investigated in a number of patients in the controlled series. Swabs were taken before treatment was started and again when the patient was discharged cured, and an attempt was made to estimate both whether any organism predominated in the series as a whole, and whether any change took place in the bacterial flora after treatment.

All the swabs examined yielded a mixed growth, and, although different organisms predominated in different individuals, no one organism was predominant in the series. The most commonly found microbes were *Strep. pneumoniæ*, *Micrococcus catarrhalis*, and streptococci, both alpha and beta. The series was too small to warrant any definite conclusions, but the impression gained was that after treatment with patulin a distinct reduction of organisms took place.

Five cases of clinical influenza were treated with a 1 : 10,000 solution of patulin, used in exactly the same way as in colds. In these cases the onset was sudden, headache and generalised body pains were the predominating symptoms, and apart from a dry cough the respiratory tract was not affected. Pyrexia persisted for 4–5 days. The course of the disease did not appear to be influenced in any way by the drug.

DISCUSSION

The ætiology of the common cold is not yet fully understood. Some workers adhere to the virus hypothesis, while others are convinced that organisms such as pneumococci, *M. catarrhalis*, streptococci, &c., are primary causes. With the ætiology and pathology of the complaint in such an unsatisfactory position it is difficult to give any considered opinion on the merits of a new curative agent, and the task is made more difficult because the duration and severity of colds varies enormously with the individual, time and place, and because the common cold is a self-limited disease.

For these reasons it is felt that although the results of the trials described in this paper are encouraging, no definite claims can be made for patulin until it has been given more extended trial in different localities.

Summary

Patulin is about equally bacteriostatic to both gram-positive and gram-negative organisms; it is much less active than penicillin against gram-positive organisms but much more so against gram-negative ones.

The bacteriostatic power of the substance is unaffected by the presence of serum or pus.

The phagocytic activity of leucocytes is unaffected by a 1 in 8000 solution, but inhibited by a 1 in 2000 solution.

The lethal dose for mice is about 0·5 mg. per 20 g. body-weight, whether the substance is given intravenously or subcutaneously Subcutaneous administration produced necrosis at the site of injection.

During the first four months of this year patulin was given a trial in the treatment of common colds which were prevalent at a naval establishment in the south-east of England. Solutions of the substance were sprayed into the nose or snuffed up from the hand.

The results obtained were encouraging, 57% of the treated cases recovering completely within 48 hours, compared with only 9·4% of the controls.

No ill effects were observed.

My thanks are due to Professor Raistrick for supplies of patulin; to the Royal Naval authorities, both executive and medical, at the depot where the trials were carried out for their coöperation; to Surgeon Lieut.-Commander H. W. Clegg for his help in the animal toxicity tests; and to SBPO Geoffrey Smith, who assisted me both in the bacteriological work and clinical trials.

I wish to thank Surgeon Rear-Admiral C. F. O. Sankey for permission to publish this paper.

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V.—Statistical Note

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The purely statistical question which arises in Commander Hopkins's work is a simple one—assuming that the treated and control populations do not differ in any *material* way, except in regard to the fact of treatment, what is the probability that such divergent percentages of cure would emerge?

It is evident that if two batches of pennies are tossed, the respective percentages of "heads" are likely to differ, and the probability that any particular difference, or a greater difference, would occur can be readily calculated. The principle involved in this stock case is fundamentally the same as in our problem, subject to a consideration I shall discuss later on.

The fundamental data are given by Hopkins in his table IV. The three sets—January, February and April—are not *in pari materia* and must not be aggregated. There is no reason why the proportion of cures

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should be the same in different months. Common sense suggests that the differences of percentages are unlikely to be "chance" happenings and it will be enough to apply an exact test to the set most favourable to the hypothesis of chance deviation—the third set. Applying such a test (see Fisher, Statistical Methods for Research Workers, pp. 94–95) it is found that in random sampling so wide a divergence in favour of the treated would occur about 3 times in 10,000 trials. It is therefore an improbable happening. In one respect, however, treated and controls are not *in pari materia*; the former included a larger proportion of patients with symptoms of not more than one week's duration (44·4, against 33·3). But, as the following table shows and common sense suggests, this is not probably material, unless there were a special process of selection, or self selection—viz., only patients with especially "obstinate" colds presenting themselves for treatment.

—	TREATED			CONTROLS		
	Patients	Recovered	% recovered	Patients	Recovered	% recovered
Symptoms of one week or less ..	75	41	54·7	63	5	7·9
Symptoms over one week ..	20	14	70·0	22	3	13·6

It could, of course, be tested by subtabulation, but, in view of the fact that in the first two series the proportions of treated and controls with symptoms of not more than a week's duration were virtually the same (87·0 and 85·1 %), and in these series the divergence is greater, the arithmetic is needless. We may certainly say that, taken as a series, the probabilities of drawing each pair from a common universe are extremely small.

That conclusion is all that purely statistical reasoning can establish. To revert to the illustration, if an experiment were made with batches of coins fresh from the mint, and their respective percentages of heads differed in such a way that, tested as these data have been tested, a probability of, say, less than 3 in 10,000 emerged that they came from a common universe, no sensible person would infer that the mint coins were biased. He would conclude that either (1) the samples were not *in pari materia* (there had been some "trick" in tossing), or (2) a very improbable event had happened—as it would, on the average, some 3 times in 10,000 trials. He would do so because the a priori improbability of bias in the mint coins is exceedingly great. In our case there is no such a priori improbability that the antibacterial substance might accelerate a cure; that it does do so is a tenable hypothesis. But, and this is the point always to be had in mind, what the statistician has shown is *not* that the odds are so and so many thousands to one in favour of the hypothesis that the antibacterial substance does cure, but only so and so many thousands to one against the chance that such results would emerge without *some* differentiation between the groups. Whether at other times and in groups differently chosen the same differentiation would be found can only be known when further trials have been made.

I am indebted to my colleague, Dr. W. J. Martin, who carried out the arithmetical tests.

INTERSTITIAL EMPHYSEMA AFTER EXTRACTION OF A LOWER MOLAR

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AT 10.10 AM on May 22, 1943, a male postal worker, aged 49, had his lower left second molar extracted under local anæsthesia. The tooth was broken during the first attempt at extraction. A further injection of local anæsthetic was made and the roots successfully extracted, but with difficulty. The patient arrived home at 11 AM, and on looking in a mirror was shocked to find the left side of his face very swollen. At 1 PM he found great difficulty in swallowing solid food. At 2 PM he lay down to sleep but had to sit up because of respiratory embarrassment.

He was seen at 6 PM. At this time the upper line of demarcation of the facial swelling was immediately below the left molar bone, at which point the swelling stood out for about ¼ inch. From this point the swelling gradually increased as it descended to the mandible, and then decreased towards the base of the neck. The upper part of the swelling was firm; on palpation it presented a sensation of sponge rubber, and sounded like it on percussion. Here it was difficult to perceive air crepitus. Below this the swelling was softer and air crepitus was easily audible to the naked ear. On ausculation air crepitus could be heard throughout the entire swelling to the base of the neck. The suprasternal fossa was puffed out with a soft swelling in which crepitus was easily heard. There were no signs of emphysema in or around the orbit. The soft palate on the affected side was bulging over the posterior edge of an upper denture, while the left side of the pharynx was swollen to a point half way towards the middle line. There was no unusual laceration of tissues at the site of extraction, nor was there any suggestion that bleeding had been more than usual. There was no increase in the swelling after he was seen, and in his opinion there had been little increase after he reached home. The condition took a full week to subside.

Prof. H. A. Harris suggests that there was probably a laceration of either the mylohyoid muscle in the floor of the mouth or of the buccinator muscle in the vestibule of the mouth. In the former case, air may pass downwards into the loose deep fascia of the neck and upwards over the mandible anterior to the masseteric fascia and the overlying parotid gland. In the latter case, air may pass medial to the buccinator and backwards towards the pterygomandibular raphe and the soft palate; also lateral to the buccinator in relation to the space occupied by the corpus adiposum buccæ. The passage of air from face to neck or vice versa could take place near the anterior margin of the masseter at the lower border of the mandible, along the loose fascia surrounding the external maxillary (facial) vein and artery.

Two cases of interstitial emphysema after maxillary molar extraction are referred to by Collyer and Sprawson (1942), one reported by Turnbull (1900), and another by Binns (1935). In Turnbull's case a bugler had bugled immediately after the dental extraction, while in Binn's case the patient's wife said that he had tried to blow through a choked pipe shortly after the extraction. Two cases of emphysema after mandibular molar extraction have been reported in America. In the first, reported by Schaefer and Williams (1933), the condition was ascribed to the use of compressed air irrigators. In the second, reported by Hopkins (1935), the extraction was of an impacted molar and apparently required a lengthy operation. Hopkins found the emphysema to extend upwards to the scalp and down to the breasts. Another case, reported in France by Houzeau (1936), followed an easy and complete extraction of a lower right third molar; no explanation was offered.

A case of unilateral interstitial emphysema of the face was reported by Kirby in 1919, but this developed as the result of drying the pulp cavity of an incisor root, to which it was intended to fit a crown, with an electropneumatic hot-air syringe. Extraction was performed after the development of the emphysema. The root was found to have a large apical foramen. Kirby does not state whether it was an upper or lower tooth.

In the case now reported no suction or compressed air was used. The patient said that on the way home he kept the left side of his face covered with his hand because his jaw was aching, and that he kept his mouth closed to prevent cold air getting into his mouth. It is possible that local pressure on the cheek overlying the socket was painful, though general pressure over the side of the face was comforting. Thus, with the mouth kept firmly closed, air may have been driven into the vestibule to blow out the cheeks and keep pressure off the painful socket.

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TUBERCULOSIS SURVEY AT A MENTAL HOSPITAL BY MINIATURE RADIOGRAPHY

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PRINCIPAL ASSISTANT MEDICAL OFFICER TO THE LCC

IT has long been recognised that there is a high incidence of pulmonary tuberculosis in mental hospitals. Mott in 1909 investigated the tuberculosis situation in all the London county asylums and estimated that 2% of the patients were suffering from active pulmonary tuberculosis and he pointed out the difficulties in the diagnosis of these cases. The rise during the last European war was noted by Evans (1927); in 1918 the mortality per 1000 residents in mental hospitals for tuberculosis was 51·8 all forms and 45·6 for pulmonary alone.

More recently Deegan, Culp and Beck (1942) made a tuberculosis survey of a mental hospital in the United States, their attention being drawn to the problem by the unduly high incidence of pulmonary tuberculosis among the staff of the hospital. Their survey was made by X-ray examination of all patients and staff on 14 in. by 17 in. films, supplemented by sputum examination where possible; and they concluded that 2·2% of the patients and 1·5% of the staff had active pulmonary tuberculosis. They found that the determination of activity among patients was difficult and for this purpose relied chiefly on serial X-ray films.

In this country, Berrington and Greenwood (1942) recently made a survey of a mental hospital using primarily the erythrocyte sedimentation-rate (ESR) as an indicator and radiographing all those with an ESR over 14 mm.; 384 chest films were taken, and it was considered that 8% of the 1100 patients investigated showed X-ray appearances of active pulmonary tuberculosis.

Attention has recently been drawn to the problem in Parliament, when a reply by the Minister of Health showed that the number of deaths from tuberculosis in the mental hospitals of England and Wales in 1942 was more than double those of 1938.

The report of the Medical Research Council on tuberculosis in war-time also draws attention to the observed increase of tuberculosis in mental hospitals and recommends that early diagnosis should be attained by periodic chest X-ray examinations of all patients in these institutions.

PRESENT INVESTIGATION

In order to determine the incidence of pulmonary tuberculosis in the Leavesden LCC Mental Hospital, it was decided to examine all patients and staff by miniature radiography, which allows of much saving in time and cost as compared with full-size radiography. At this hospital there has been, since 1939, a considerable increase in the observed death-rate from pulmonary tuberculosis among male patients, but not among the females (figs. 1 and 2).

Method.—The existing 4-valve Dean model X-ray plant was adapted to the miniature technique by Messrs. Kodak Ltd. A special camera incorporated in a light-proof tunnel was constructed and this could be attached direct to the screen. The camera contained up to 100 ft. of film and was fitted with a Dallmeyer 2 in., focal length 0·5, lens and was used in conjunction with a Rotalix tube. The set was operated at 200 milliamps with an average kilovolt pressure (kVP) of 60 and exposure time of 0·15 sec.; the latter remained constant for most patients, the kV being varied according to the thickness of the patient's chest. The exposure time was kept as short as possible because these patients were liable to move. Identification cards were made out for each subject and these were photographed on the miniature film at the time of exposure. After careful processing the films were examined by projection up to an approximate size of 8 in. by 8 in.

In spite of the difficulty of marshalling and controlling these uncoöperative and often resistant patients, it was found possible to X ray 50 in 30 minutes. Satisfactory positioning of many of them was difficult, partly because deformities were common, and also because many could not coöperate by keeping still or "holding their breath"; as a result it was impossible to obtain satisfactory films in some cases.

Procedure.—2035 patients (938 males, 1097 females) and 224 members of the hospital staff were investigated by miniature X-ray examination. In order to complete the experiment, bedridden and deformed and even resistant patients were examined on 15 in. by 12 in. films. Further, all those patients previously notified to local authorities as cases of tuberculosis were similarly examined, so that in all 2271 inmates were the subjects of this survey and only 0·8% of the inmate population were unable to participate in the test.

RESULTS

Patients.—Of the 2035 films, 153 were selected for re-examination on 15 in. by 12 in. films; of these 119 were suspicious of pulmonary tuberculosis in varying degrees, the remainder having some deformity or abnormality other than tuberculosis. It was found that some of the patients discovered in this way had previously been suspect on clinical grounds. Of these 119 cases, 12 males and 18 females showed evidence of widespread calcification in the lungs, while many others showed single or a few calcified nodules indicating that they had apparently recovered spontaneously from pulmonary tuberculosis. It was remarkable that only 3 of the newly suspected cases showed X-ray evidence of cavitation.

A full investigation was made in each of the 119 suspects and comprised: physical examination; temperature and weight recordings; sputum examination (when obtainable); blood ESR and monocyte-lymphocyte ratio; the culturing of fæces and of products of gastric lavage for tubercle bacilli; Mantoux reaction; and D'Amatos test (leucopenia after injection of tuberculin). These diverse investigations were called for because it was apparent that the distinction between the active and inactive case presented unusual difficulties. In these patients, a high proportion of whom are low-grade mental defectives, respiratory movements are poor and physical signs difficult to elicit, sputum is usually unobtainable because it is often swallowed; indeed, no specimen was found to contain tubercle bacilli, while only 4 stomach washouts returned positive results despite intensive search. Almost complete loss of the cough reflex in most cases makes the laryngeal mirror test of little use. Moreover, these patients are asymptomatic or are incapable of giving a connected account of themselves; cough is not a prominent feature and since the war a considerable percentage of all inmates have lost weight.

Some of these tests are admittedly of doubtful value in assessing the activity or otherwise of a case, but taken together they constitute a pointer. Certainly we do not feel that a diagnosis of activity or otherwise should be made on the X ray alone.

As a result of these tests and the X-ray films, 32 new active cases of pulmonary tuberculosis have been discovered (19 male, 13 female) by the miniature survey, although only 4 of these have been confirmed bacteriologically. In addition about 50 cases show definite X-ray appearances of pulmonary tuberculosis, and though these seem at the moment to be inactive they will require close future observation.

In the 183 patients of whom 15 in. by 12 in. films only were taken, skeletal defects often made diagnosis difficult. In all, 20 were selected as requiring full investigation and of these 4 were judged to be cases of active pulmonary tuberculosis. In addition, 7 showed evidence of widespread calcification in the lungs. A total of 36 active cases was therefore revealed.

The "already notified" cases of pulmonary tuberculosis in Leavesden numbered 48 (28 males; 20 females) and all were examined radiographically on 15 in. by 12 in. film; 19 (9 males, 10 females) showed either no evidence of pulmonary tuberculosis or minimal healed lesions only, and they could reasonably be removed from the tuberculosis wards.

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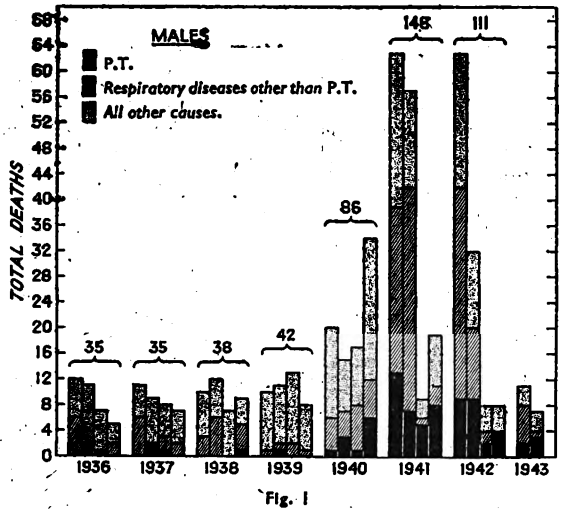

Fig. 1

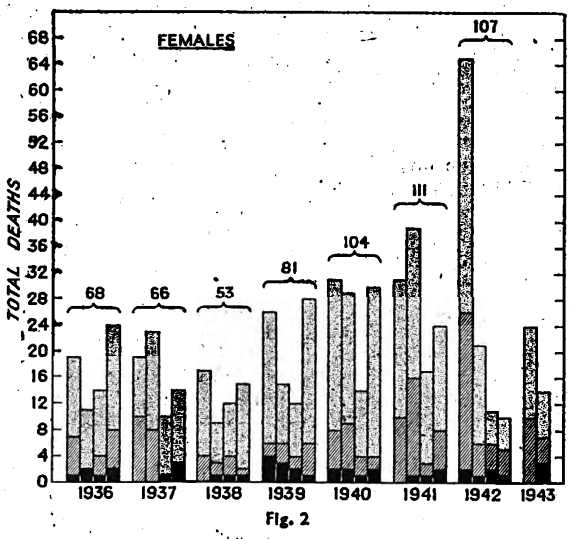

Fig. 2

ASSOCIATION OF PULMONARY TUBERCULOSIS AND MENTAL DEFECT

Active or doubtfully active pulmonary tuberculosis was found in the following percentage in the various types of defect, as a result of the radiographic survey:

	Cases at risk	%
Idiots	162	0·6
Imbeciles	907	2·5
Feeble minded	691	0·9
Psychotics	475	2·5

(M 4%, F 1·8%)

The relatively high incidence in the imbecile group is probably attributable to their degraded habits, and the difficluty of supervising them when they are ambulant. The idiot group, on the other hand, includes a high proportion of "chair cases" who are relatively immobile and, although degraded in their habits, are under such strict hygienic control that they are in some respects less liable to contract infection than higher-grade patients.

Age-incidence.—The age-incidence of the 32 active cases was compared (fig. 3) with the numbers at risk in the hospital, the latter columns being reduced to 1/10th. It will be seen that the incidence of pulmonary tuberculosis in these patients does not agree with the curves found in the general population. The incidence in younger patients is comparatively low and the higher age-groups are chiefly affected—e.g., there was an incidence of 4·4% in males aged 50–59, and 10 suspects occurred in the over 70 group.

STAFF

Miniature films were taken of all staff who consented, 224 in number (M 105; F 119); 37 males and 5 females refused examination. As a result, 9 large films were taken and 3 of these seemed to show evidence of pulmonary tuberculosis. It transpired that one was a previously notified case, one resigned before clinical investigations were completed and the third showed no clinical evidence of activity.

TOTAL INCIDENCE

The sum of the newly discovered cases, active and inactive, showing widespread calcification, and the cases of tuberculosis which had previously arisen among the hospital patients indicates that about 6% of the inmates are suffering from or have at one time had pulmonary tuberculosis, while the present percentage of active cases seems to be between 2 and 2·5%. This is about the same figure as was found in all the London county asylum by Mott in 1909 and by Deegan et al. in 1942.

DISCUSSION

Although the numbers of new cases of pulmonary tuberculosis disclosed are not large, their segregation and the close observation of the apparently inactive cases should help to reduce the future incidence of the disease.

The patients investigated are principally those suffering from some form of congenital mental defect and it is quite possible that the incidence in other types of mental disease may be different. Mott, referring to the incidence of pulmonary tuberculosis at Leavesden during the years 1903 to 1907, cites Dr. Elkins's figures indicating that 30% of all deaths that occurred at Leavesden were due to active phthisis (95% of these were confirmed by autopsy). It is true that predominantly the same type of case is under care at Leavesden now and that the incidence of pulmonary tuberculosis and the death-rate from that disease is now high; but it would be quite unjustifiable to conclude that a high death-rate from tuberculosis is inevitable or even usual in institutional mental deficiency practice. Indeed, except for the high death-rate attributable to this cause during these two great wars, the actual number of deaths from, and the incidence of, pulmonary tuberculosis have steadily declined. For example, during the years 1936, 1937 and 1938, pulmonary tuberculosis was responsible for 6·3% of all male and 6·9% of all female deaths at the hospital. Furthermore, the incidence of pulmonary tuberculosis among female patients continues to be low and the war-time increased fatality-rate is a phenomenon

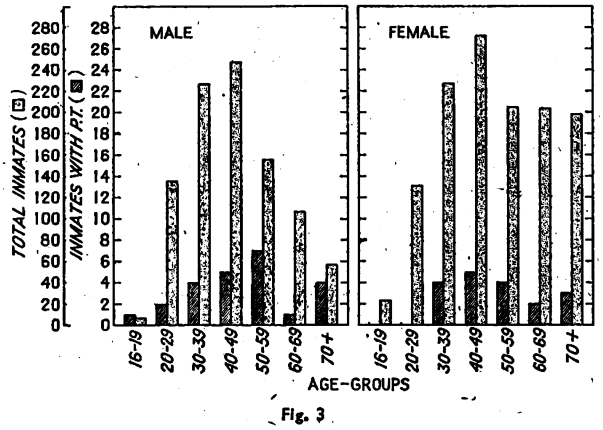

Fig. 3

confined to the male cases. It is not within the province of this paper to speculate on why this is the case but it is manifest that improved amenities and care have improved the situation since Mott's survey.

The chief clinical interest lies in the type of pulmonary tuberculosis which has been demonstrated. These mental defectives lead an inert, vegetative existence, their movements being limited by deformity or lack of volition, their respiratory movements are reduced and the cough reflex itself seems to be greatly depressed. In many of them the disease process itself appears to follow a subclinical and comparatively benign course, resulting in spontaneous cure. The lack of symptoms,

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the rareness of cavitation and frank hæmoptysis, the negative bacteriology and the incidence of widespread calcification, all support this view. No doubt the ordered conditions of life in the mental hospital conduce to a favourable outcome. Not all cases, however, as is shown from the number of deaths from tuberculosis which are actually recorded, behave in this way, but even in these the disease runs an asymptomatic course until its ultimate stages.

Illustrating the acute type of case, is the fact that since the radiographic survey some 8 months ago, 15 patients who were examined have died of pulmonary tuberculosis; 6 of these 15 were not suspected on examination on the miniature films and a recent review of these films fails to show any definite evidence of tuberculosis, though the X rays are of rather variable technical quality. A 15 in. by 12 in. film of good quality was taken of one of these patients at the same time, and this again shows quite clear lung fields; yet this patient had died of active pulmonary tuberculosis within a month.

The post-mortem appearances of the lungs of these cases are interesting in that they show racemose and miliary tuberculosis, patches of consolidation, caseation and small recent cavities full of caseous material. In many, small intestinal ulcers and caseating lymph-nodes in the mesentery were discovered. In one case there was tuberculous disease in the temporal lobe of the brain and in another tuberculosis of the knee-joint, which might have been the primary focus of existing miliary spread. This type of very acute case seems to be becoming more noticeable since the beginning of the war.

SUMMARY AND CONCLUSIONS

Series of 2035 patients and 224 staff of Leavesden Hospital have been examined by miniature radiography.

A group of 183 bedridden and deformed or resistant patients and already notified cases have been examined on 15 in. by 12 in. films.

Exhaustive clinical and pathological examination of suspects has been undertaken.

The examination detected 36 apparently new cases of pulmonary tuberculosis; in addition 87 cases, including 37 showing widespread calcification, seemed to have inactive lesions.

Of the "already notified" cases 19 did not, in fact, show evidence of active pulmonary tuberculosis.

The total incidence of tuberculosis (active, inactive and cured) is estimated at 6%, of which 2% are active.

The unusual clinical type of pulmonary tuberculosis in these cases is described.

No case of active tuberculosis was detected in the hospital staff, but 3 were "suspects."

Asymptomatic cases can be detected by chest X-ray examination.

The miniature X-ray film proved its value in economy in time, labour and cost, but these patients provided a peculiarly difficult group from which to obtain satisfactory films, and the routine use of 15 in. by 12 in. films would normally seem to be preferable, although the possible use of a 4 in. by 5 in. mass-radiography unit for large-scale surveys of mental patients should be seriously considered.

We have to thank Dr. W. Allen Daley for the interest he has shown in this paper, Dr. R. M. Stewart for his assistance, and Dr. R. Cruickshank and Dr. H. Angell Lane for the pathological work; also Messrs. Kodak Ltd., for providing the apparatus and to their representative, Mr. J. L. Crooks, who was responsible for taking and processing the miniature films.

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Spec. Rep. Ser. med. Res. Coun., Lond. (1942) no. 246, p. 27.

PHARMACISTS' GIFT TO CHINA.—The Pharmaceutical Society of Great Britain has made arrangements to send from London a representative collection of 49 volumes to form the nucleus of a pharmaceutical library for the Pharmaceutical Society of China, which now has its headquarters at Hsinchiao, Chungking.

Medical Societies

ROYAL SOCIETY OF MEDICINE

AT a crowded meeting of the section of experimental medicine and therapeutics on Nov. 9, with Dr. R. D. LAWRENCE, the president, in the chair, a discussion was opened on

Penicillin

Prof. ALEXANDER FLEMING, FRS, told how about fourteen years ago he had noted the inhibitory effect on staphylococci of the mould *Penicillium notatum* which had accidentally contaminated one of his plates. Being interested in "natural antiseptics" he had preserved and grown the mould and found that culture filtrates contained an inhibitory substance active against a variety of organisms. This he named penicillin. But the early filtrates were weak and attempts at concentration failed until the brilliant success of Florey and his colleagues reported in 1940. Thus penicillin therapy became possible in suitable infections. For success it must be certain that the organisms are sensitive and the preparation of penicillin really potent. Because of rapid absorption and excretion, doses had to be repeated frequently if an effective concentration of penicillin was to be maintained. After repeated penicillin injections it was possible to demonstrate inhibitory effects on streptococci or other sensitive organisms with blood-serum diluted 1:1000 and with urine diluted 1:20,000. The action was, as with sulphonamides, bacteriostatic and not bactericidal. On leucocytes and tissues there was no toxic action and the synergistic effect of natural immunity processes should not be forgotten. The most important step for future progress would be the analysis and synthesis of penicillin.

Prof. H. W. FLOREY, FRS, paid tribute to his colleagues who had shared with him at Oxford the work of developing penicillin. With cultures obtained from Professor Fleming, in media recommended by Professor Raistrick, they had produced penicillin in amounts which permitted extraction and purification. The potency and purity of the product for clinical use were now many times those of the earlier preparations and were such that dilutions of 1:50 million to 1:100 million inhibited streptococci and dilutions of 1:256 million produced changes in the morphology of the organisms. Penicillin was effective against a range of organisms which included staphylococci, streptococci, pneumococci, clostridia, anthrax bacilli, gonococci, meningococci, and some others which though less sensitive might yet be brought within the scope of therapy. Coliform bacilli, *Proteus* and *Ps. pyocyanea* were insensitive; so also, most unfortunately, was the tubercle bacillus. Penicillin should be carefully handled to maintain its potency. It must be kept within a pH of between 5 and 7; it was destroyed by acids and alkalis, boiling, oxidising agents, some bacterial enzymes and heavy metals such as copper and lead. Its production on a large scale called for great skill and effort. Penicillin was non-toxic, and was not inhibited by pus, tissue autolysates, blood or serum. The number of bacteria present did not modify its effects; there was no need to seek the minimum dosage. The drug was rapidly excreted in urine, bile and saliva but was not found in tears or pancreatic juice. Rapid absorption took place from muscle or subcutaneous tissue, but the drug was destroyed, if given by mouth, by the HCl in the stomach. Rectal administration was ineffective because coliform bacilli destroyed penicillin. In man it was well established that coccal septicæmic infections could be cured by parenteral administration in doses of 15,000 units given every 3–4 hours. Failure were due to inadequate dosage, inactive preparations of penicillin or insensitive organisms. Major Scott Thomson had found that 4% of staphylococci were resistant to penicillin. Local administration also yielded successful results in suitable cases where adequate access and sustained application of sufficient amounts could be secured. Developments in surgical technique were important in furthering the success of local treatment. Instillation of solutions through tubes and insufflation of powder with an effective blower were the methods of choice. Through the coöperation of the Army it had been possible for Brigadier Cairns and himself to try out penicillin in North Africa in the treatment of war

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casualties. Their aim had been early treatment of wounds to prevent infection, and this first trial of penicillin in a new field had been highly successful. It had been possible by local and parenteral use of penicillin to close open wounds of soft tissues and bones. Under ordinary conditions infection made impracticable the closure of any war wound more than 6 hours old. But with penicillin infection could be prevented so that wounds could be closed. As a result healing was much more rapid and restoration of function more complete.

Professor Florey then showed a film—mostly in colour—which brought out clearly the technique of penicillin administration and demonstrated the admirable results of the new treatment under difficult conditions.

Flight-Lieutenant D. C. BODENHAM, RAF, described the treatment of surface wounds with local applications of penicillin. The drug had been used in solution, as a powder diluted with sulphonamides and in a cream with a lanette wax and soft paraffin base. Surface wounds, gutter wounds, sinuses and cavities had all been treated with good results using remarkably small amounts of penicillin. It was important, however, to recognise that in complex cavities, such as the knee-joint, and in older lesions penicillin alone could not be expected to effect cures. It was necessary by surgical treatment to secure the best conditions for effective application of the penicillin.

Colonel E. C. CUTLER, USAMC, described the combined method of local and parenteral administration of penicillin which had been used in treating wounded men from bombers. At the initial operation the wound was trimmed and 10,000–20,000 units of penicillin was applied locally as a powder or as a solution in 500 c.cm. of fluid. Thereafter 10,000 units was given parenterally every 3 hours. Treatment was controlled by estimations of penicillin in the blood and by daily cultures. Most of the results were good. Four men with compound fractures from whose wounds clostridia were cultured all recovered.

Mr. R. VAUGHAN HUDSON, FRCS, paid tribute to the research workers whose efforts had made penicillin available. He quoted good results from the treatment of wounds by local application of penicillin. Of those considered for treatment about half had to be excluded chiefly because the organisms were insensitive. Complete sterilisation was not essential for healing; blood-supply, trauma and local metabolism were important factors. Surgery had a part to play—abscesses must be opened, for example. Systemic treatment had given useful results, but an actinomycotic infection of the neck had relapsed with the primary infecting organism still present although the secondary staphylococcal infection had been eliminated.

Prof. R. V. CHRISTIE, FRCP, had treated 104 cases by local application and 13 by systemic administration. In infants it was useful to give penicillin into the bone-marrow of sternum or tibia. Local application had been tried in 34 bone infections with sinuses; all but 3 of the cases were of more than a month's duration. Fourteen were cured, 13 were better and 7 unchanged. Surgical treatment must be combined with penicillin to ensure adequate access to the lesion; presence of a sequestrum did not preclude success but the results were not so good. A variety of soft-tissue infections had been treated, including sycosis barbæ and impetigo. At first he treated only one side of the face in cases of sycosis barbæ of many years' standing, leaving the other as control. The treated side cleared up but relapsed when penicillin was stopped. But by treating both sides of the face, giving if necessary two courses each of about 42,000 units, many cases were cured. It was certain that penicillin was so far the best treatment for this condition. From two lesions which became worse under treatment resistant organisms were cultured. The results in 5 cases of impetigo were very good.

Lieut.-Colonel J. S. JEFFREY, RAMC, who had used penicillin in North Africa, said surgeons must not be upset by the appearance of pus due to gram-negative organisms in wounds treated with penicillin. In all wounds where there was a dead space such pus was to be expected; it did not delay healing and could be dealt with by leaving an opening in the centre of the wound. There was no need to take out sutures because of such gram-negative pus.

Dr. MARY FLOREY described the good results from treatment of septic hands by surgery combined with local application of penicillin. Over 300 infections had been treated; most were due to staphylococci but the lesions were varied. Including all cases, even those treated while dosage and technique were in the experimental stage, she could report 250 with complete recovery, 41 with improvement, and only 14 without benefit. The infections treated had been present for from 2 months to 32 years before penicillin was used on them. In treating acute infections of the hand a controlled experiment was set up. A hundred septic hands were treated by current technique without penicillin and the results compared with another hundred where penicillin was used in addition to the same measures as in the control group. In the penicillin group organisms disappeared more quickly, and there was also more rapid relief of pain, subsidence of swelling, and disappearance of pus. Healing was more rapid but above all restoration of function in the penicillin group was very much better. In tendon sheath infection the advantage in this respect of the penicillin over the control group was especially striking.

Major ROBINSON, USAMC, described the usefulness of penicillin in treating sulphonamide-resistant gonorrhœa; 93 cases were cured by a single course of 100,000 units given in doses of 15,000 units intramuscularly every 3 hours. Only 2 men were not cured by such treatment; of these one responded satisfactorily to a second course, the other was the single failure in the series of 95 treated. No toxic effects were seen. Anterior and posterior urethritis, prostatitis, epididymitis—all responded well, although it was worth noting that the one failure had epididymitis. Thirty cases had so far been followed for a month after treatment but no relapse had been seen.

In the general discussion Professor FLOREY explained that the Oxford unit was a purely arbitrary amount of penicillin which had been originally used for research purposes but was now employed in expressing clinical dosage. He did not feel that attempts to delay absorption would improve clinical results; it was the rapid excretion by the kidneys that made frequent administration necessary.—Major-General L. T. POOLE wondered if Colonel Cutler had given gas-gangrene antitoxin to the men in whose wounds he had found clostridia.—Colonel CUTLER replied that antitoxin had been given.—Lieut.-Colonel JEFFREY said it was important to give antitoxin as well as penicillin in treating gas gangrene. In necrotic tags of tissue clostridia could persist. Penicillin would be unlikely to reach them but the toxin they formed would be absorbed and required neutralisation. Only antitoxin could do that although the penicillin would prevent spread of the disease.—Dr. ROBERT CRUICKSHANK agreed that the administration of gas-gangrene antitoxin was important and said it would be most unfortunate if the meeting were to form any different impression.

MANCHESTER MEDICAL SOCIETY

AT a meeting of this society held on Oct. 6, Dr. A. RENSHAW read a paper on recent advances in the treatment of

Rheumatoid Arthritis

Differences he had noted in the mucosa of the small intestine when examined post mortem had led him to assume in this disease a definite deficiency of secretion from the massive digestive organ, and he claimed to have seen benefit from giving a preparation of erepsin orally to such cases and also to cases of early osteo-arthritis, fibrositis, spondylitis, Still's disease, Paget's disease with rheumatoid arthritis (1 case), and asthma with arthritis (1 case). He described the mode and time of administration of the erepsin preparation, the diet, and the avoidance of ancillary treatment. Of the 200 cases so treated 89·5% showed some improvement, and 60% were able to return to work. Considerable patience, he said, had to be exercised, since relapses occurred on cessation of active treatment, with improvement again on recommencing treatment—as occurred in dealing with a deficiency disease. The lecture was illustrated by slides of post-mortem sections and a film. A brisk discussion followed, and in answer to questions Dr. Renshaw said he had not examined the ereptic activity of the intestinal contents or the fæces in the cases during life.

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Reviews of Books

Diseases Affecting the Vulva

(2nd ed.) ELIZABETH HUNT, MD LPOOL. (Kimpton. Pp. 140. 21*s*.)

THIS is an extremely useful book since it coördinates the viewpoint of the gynæcologist and the dermatologist about conditions affecting the vulva. Skin lesions of the vulva are often modified in appearance by conditions peculiar to the site, so that there is difficulty in differentiating even the most familiar types of skin lesion. Confusion may arise, too, because sensitisation is often localised though the action of the agent causing the reaction is generalised. Thus phenolphthalein, a common constituent of aperients, is cited as causing an acute erythematous rash of the vulva. The special irritability of the vulva to trauma or discharge makes pathological conditions of the skin in this area particularly common. The gynæcological aspects are well represented, and pathological conditions of the vulva are dealt with systematically. Dr. Hunt believes that kraurosis is a late stage of leukoplakia vulvæ or lichen planus, and she deprecates the use of huge doses of ovarian hormone which have been advised for this condition. The book contains details of treatment and numerous prescriptions which will be useful alike to gynæcologists and general practitioners.

Manometric Methods

As applied to the measurement of cell respiration and other processes. (2nd ed.) MALCOLM DIXON, PH D, SC D, FRS. (Cambridge Univ. Press. Pp. 155. 8*s*. 6*d*.)

THE added list, in this second edition, of biological systems which have been studied and of the substances which can be estimated in this way, prove that manometric methods are being applied to an increasing variety of problems. Among the refinements of existing methods developed since the first edition are Dixon's modification of the Dixon-Keilin method of measuring glycolysis in serum. The theory of the Fenn respirometer which is widely used in America has been fully worked out, and manometers of greatly increased sensitivity are described; these so-called ultramicro methods allow the determination of exchanges of gas of the order of 0·001 c.mm. Among those described in some detail are Heatley's microrespirometer and the Cartesian diver ultramicromanometer which was first suggested by Linderstrøm-Lang and worked out by Boell and Needham. A wise balance has been kept between the methods only to be applied by a specialist, and those for everyday use in the laboratory. The attention given to many details which may at first seem trifling will be appreciated by everyone working with these methods: the author, in his wide experience, does not err on the side of over-cautiousness. A set of protocols of actual experiments given at the end of the book illustrates the working of different methods and will be useful to the beginner. Dr. Dixon's book, already indispensable for the research worker using manometric methods, will stimulate many branches of biological and applied research.

Diseases of Infancy and Childhood

(4th ed.) WILFRID SHELDON, MD LOND., FRCP. (Churchill. Pp. 748. 28*s*.)

SINCE the last edition of this sound guide to pædiatrics, the author of its foreword, Sir Frederic Still, has died and Dr. Sheldon pays a tribute to his memory in his new preface. Many of the advances in general medicine find their applications to diseases of children in the revisions and additions in this new edition, and part of a useful series of appendices copes with the sulphanilamide group of drugs and with the proprietary forms of the available vitamins. The chapter on the newborn baby bears testimony to an increased interest in and knowledge of children at this period of life, but the section on tetanus of the newborn omits the doubts that some authorities have cast upon the existence of this malady; tetanus in older children, still a troublesome and dangerous condition, is unfortunately not considered at all. The whole book bears signs of painstaking revision and its standard of production, including a good index, shows little evidence of war-time difficulties.

Chemistry and Methods of Enzymes

J. B. SUMNER, professor of biochemistry, Cornell University; G. FRED SOMERS, instructor in biochemistry at the university. (Academic Press. Pp. 365. $5.)

THIS volume is divided into four parts of which part I dealing with the general properties of enzymes is perhaps the most interesting. The second part deals with special enzymes such as esterases, enzymes concerned with carbohydrate metabolism and general metabolic processes. The third is concerned solely with oxidising and reducing enzymes, and the fourth with hydrases and mutases. The chapter on the yellow enzymes is exceptionally good, and the index and references are of the high standard we have learned to expect from American publications.

ANATOMY OF THE FEMALE PELVIS.—In the review of this book on p. 510 of our issue of Oct. 23, we regret that the name of Dr. Smout's coadjutor was inadvertently omitted—F. JACOBY, MD, PH D, lecturer in histology, University of Birmingham, who contributed the sections on the histology of the female reproductive tract and ovarian endocrine function.

New Inventions

SPECTACLE ATTACHMENT FOR GAS-MASKS

Dr. S. W. G. HARGROVE has devised a simple way of attaching spectacle lenses outside the windows of a service or civilian duty respirator, thus obviating the inconvenience of spectacles which become fogged or displaced inside the respirator. A somewhat similar device had been described by J. Bruce Hamilton in Australia (*Med. J. Aust.* 1942, ii, 167).

The nose-pads and cross-pieces of the spectacles are removed together with the side members. At the original attachment of the nose-pads, a strip of wire 6–8 in. long is soldered and the wire is bent into a circle around the lenses (fig. 1). This wire should have a cross-section not greater than the cross-section of the thread in the eye-piece of the respirator; so that it will fit into the thread and hold the lenses in position. It should be springy—piano wire does well. The letters L or R should be placed on the lateral attachments of the steel rim surrounding the lenses, so that the lenses can be distinguished when they are removed for cleaning. The attachment is placed in position by compressing the wire circle between the thumb and first finger of the right hand. The inner soldered side of the lenses is first placed in position in the innermost thread of the eye-piece and the remainder of the wire then sprung into the innermost thread. The adjustment of the lenses in the eye-piece of the respirator can best be carried out by using a mirror. The respirator is placed over the face and the attachment is adjusted until the vision is correct. Fig. 2 shows the spectacles in position. The cost of this adaptation is about 6*d*.

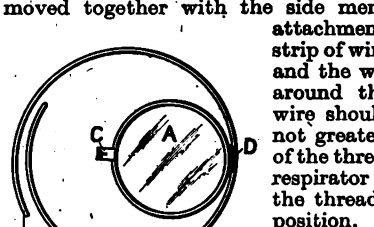

Fig. 1—Attachment ready for insertion. A, lens; B, strong flexible wire; C, side piece; D, solder.

With this attachment a man who wears spectacles can apply his respirator as quickly as a man who does not, and if a gas-attack is expected the spectacles can be left attached. There are disadvantages to wearing the lenses in the eye-piece of the respirator. The lenses are a long way from the eye and refraction is inaccurate; this can be overcome by allowing for this distance when the lenses are refracted by the oculist. It is not easy to keep the field of vision constant with a small lens set at a distance from the eye. With high refractive errors a prismatic effect is obtained to a certain extent by inaccuracy in centring the lenses. But from a personal trial Dr. Hargrove finds the advantages outweigh the disadvantages.

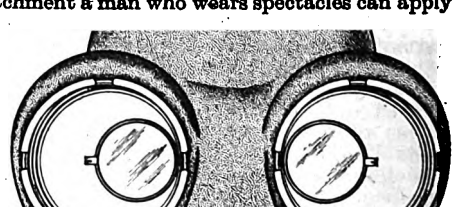
Fig. 2—Service respirator with lenses in position.

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THE LANCET

LONDON: SATURDAY, NOVEMBER 20, 1943

MOULDS AND COLDS

WIDESPREAD interest will be aroused by the group of reports at the front of this issue. These show that the beneficent genus *Penicillium* has provided us with another substance of therapeutic promise. From the mould *P. patulinum*, Professor RAISTRICK and his colleagues have isolated an active principle which they call patulin, and which they have identified chemically. This feat is part of a series of researches of great potential value, but it may have immediate value too. An almost accidental observation by Professor GYE suggested that patulin might be useful in the treatment of the common cold, and the reports include an account of its trial for this purpose by Surgeon Commander HOPKINS among naval personnel at Chatham.

The difficulties of such a trial are greater than may appear. A severe streaming cold has objective signs that leave no doubt of the diagnosis, but it may clear up suddenly in the absence of treatment. With a mild cold there may be no objective signs, the course varies, and the time of termination is often hard to determine. We lack any susceptible experimental animal save the inconvenient and expensive chimpanzee. In short, it is extraordinarily difficult to plan exact researches on the cold so as to eliminate psychological factors. Needless to say, the three naval trials were planned carefully with these dangers in mind. Alternate subjects received patulin and an inert fluid which they thought was patulin, sprayed, snuffed up or instilled from a pipette into the nose. In the third trial even those in charge did not know which was the treated and which the control group. The criterion adopted was "recovery within 48 hours," and in each of the three trials there was a strong balance of evidence in favour of the treated group: 44% recoveries against 2·4%, 70% against 12%, and 83% against 22%. An effective remedy for colds would be so welcome that everyone will be tempted to regard these figures as conclusive. But we understand that another investigation elsewhere gave results that were anything but encouraging, and we must await—with what patience we may—the additional evidence needed to demonstrate beyond doubt that patulin combats colds and (if so) how it does it.

One may imagine a "cold cure" to work in one of several ways: for example, it may have pharmacological properties leading to shrinkage of the inflamed mucosa; it may act chemotherapeutically on the causative virus; or it may have a similar action on secondary bacterial invaders. On the whole it seems least likely that patulin acts directly on the cold virus; if it did so, we should hardly read of rapid relief of symptoms only to be followed by recurrence and further relief by more patulin sprays or douches. The evidence of some immediate amelioration of symptoms is strong, but the very rapidity of the effect is a reason for thinking that a pharmacological mechanism must be concerned. No evidence is offered as to whether patulin can act as a vasoconstrictor or in other relatively simple way produce the local relief. Experience with ephedrine and similar remedies suggests that, while symptoms may be relieved, the course of the disease is unaffected. Yet patulin is thought to have shortened the infection in many instances. Is its pharmacological action such an improvement on older remedies that it brings about this desirable end? Or do its bacteriostatic powers come into play to keep secondary invaders at bay? Or has the symptomatic improvement deluded the subjects into thinking that the drug has actually cured them?

Comparison with that other mould product, penicillin, is inevitable. Patulin has one immense advantage, its far greater yield—up to 1 gramme per litre of culture filtrate. But it is toxic compared with penicillin, both against leucocytes and in mice: 0·5 mg. subcutaneously or intravenously will kill a mouse of 20 g. and smaller doses induce local inflammatory reactions under the skin. Patulin is bacteriostatic in vitro, even in the presence of serum and pus. We read that it "is very much less active than is penicillin against gram-positive organisms, but the position is reversed with regard to the coli-typhoid-salmonella group." In fairness to penicillin, it should be pointed out that a comparison is here made between pure patulin and such admittedly impure preparations of penicillin as were available two years ago. In fact patulin had very nearly equal activity against the various bacteria tested, activity of the same order as that recorded for penicillic acid and other mould products: against none was there activity of the order of penicillin's against gonococci. What we still lack is evidence that patulin has antibacterial activity in vivo, and this knowledge is needed to help us to learn how patulin acts and hence what we may reasonably expect it to do. As a result of examining nasopharyngeal swabs of treated and control subjects, Surgeon Commander HOPKINS merely records an impression that a distinct reduction of organisms took place.

We are glad to know that patulin "will not be released for general issue pending the completion of further large-scale confirmatory trials."[1] This is especially desirable because the report we publish indicates that the use of patulin, as of other local remedies, may not be free from the risk of favouring the development of sinusitis. It would be a thousand pities for the public to have a cold remedy dangled before its streaming eyes before there is reasonable certainty of its efficacy; and if it succeeds in some cases we must still be prepared for the possibility that it will fail in others. Meanwhile, winter is upon us and its colds should be here in sufficient numbers to permit an early answer as to whether or not patulin will justify our hopes and prayers.

ALEXIS AND TOM

TOM, an American now aged 57, developed an impassable stricture of his œsophagus after swallowing some extremely hot clam chowder 48 years ago. Ever since then he has taken all his food through a gastrostomy opening. For 3 years he has been laboratory assistant to S. WOLF and H. G. WOLFF, at the New York Hospital. Their observations on the

1. The material for these trials will be supplied by the Therapeutic Research Corporation of Great Britain under the brand name 'Terconin.'

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cuff of mucous membrane round the stoma, the changing appearances of which are strictly parallel with those of the rest of the stomach as seen with a gastroscope, have already been mentioned in our columns.[1] The results, which now appear in book form,[2] are as illuminating as those obtained by WILLIAM BEAUMONT[3] in his famous investigations over a century ago on Alexis St. Martin, who had developed a gastric fistula as a result of a gunshot wound of the abdomen. Whereas BEAUMONT was mainly interested in the chemistry of digestion, WOLF and WOLFF have been primarily concerned with the influence of emotions. They found that secretory and motor activity of the stomach is accompanied by increased vascularity of the mucous membrane. When Tom was contented, the mucous membrane was pink, a small quantity of acid gastric juice was constantly secreted, and contractions were weak and rhythmic. During digestion increased secretory and motor activity were accompanied by increased blood-flow, the mucosa becoming redder and thicker. Acute fright and continued depression led to diminution in gastric secretion and pallor of the mucosa. Acute resentment and anger, and continuous anxiety led to hypersecretion, and hypermotility with congestion of the mucous membrane, which became thick, red and turgid, its appearance being exactly like what gastroscopists describe as hypertrophic gastritis. The congested mucosa was very vulnerable, a stroke or tap with a glass rod and slight suction producing a submucous hæmorrhage, which was quickly replaced by a black spot or occasionally by a minute erosion. The latter was at once covered by mucus, and healed within 24 hours. The hæmorrhagic points and black dots often seen with the gastroscope are thus probably the result of injury of the congested mucosa by the instrument, or by the bulb of a Ryle tube introduced a day or two earlier for withdrawing fractions of a test-meal. Spots of bright blood in a test-meal are probably of similar traumatic origin.

These observations explain the remarkable differences in the incidence of hypertrophic gastritis recorded by different observers. Whereas some believe that it is extremely common both in civil life and in the Services, and discharge many men with this diagnosis, several experienced gastroscopists regard it as rare in civilians and almost non-existent in the Army. The gastroscopist who completely allays the anxiety of his patient and causes little distress by his examination does not see a thick, red mucosa, whereas one who is less successful in these respects observes it often and comes to the erroneous conclusion that hypertrophic gastritis is common. Doubt had already been thrown on the significance of the condition by the observations of MAGNUS and RODGERS[4] who failed to discover any anatomical basis for it in specimens obtained by operation and at autopsies, though a recent gastroscopy had shown what they would have hitherto diagnosed as hypertrophic gastritis.

When a patient with a chronic ulcer is suffering from pain, and when an ulcer has just bled or perforated, direct inspection shows that the surrounding mucous membrane is swollen and congested, whereas in quiescent periods it is thin and pale. This has generally been regarded as evidence that an "attack" of ulcer is due to active inflammation, whereas it now seems likely that the congestion is the result of acute resentment or anger, or chronic anxiety. Here we have the explanation why the recurrence of symptoms and the development of hæmorrhage and perforation are so often emotional in origin. A striking example of this was the exceptionally high incidence of perforation during the weeks when London was subjected to constant bombing. WOLF and WOLFF found that Tom's erosions developed into ulcers if they were constantly exposed to acid gastric juice by wiping away the mucus which otherwise protected the mucous membrane. An erosion produced by friction of insufficiently chewed food or hard pips and tough skins and fibres on the very vulnerable congested mucosa of an anxious patient is likely to develop into a chronic ulcer in a person with the ulcer diathesis, which manifests itself in a special tendency to hypersecretion and hypermotility and consequently of mucosal congestion.

1. *Lancet*, 1943, i, 435.
2. Wolf, S. and Wolff, H. G. Human Gastric Function, New York, 1943.
3. Beaumont, W. Experiments and observations on the gastric juice and the physiology of digestion, Plattsburg, 1833.
4. Magnus, H. A. and Rodgers, H. W. *St. Barts' Hosp. Rep.* 1938, 71, 129.

ORTHOPÆDIC TRENDS

"THE glory of children are their fathers," said SOLOMON. The heritage of the modern orthopædist is a fine one; for their fathers were men of intellect and sincerity, who studied intensely the natural powers inherent in all living flesh. The pace of their work was more leisurely than ours, the diseases and deformities they treated called for no hurry, there was no need to accelerate nature, no need to rush men back into the hurly-burly of war or even into industry. Their wound was a clean one, usually bloodless, rarely septic, and there was none of the mess and mush of immediate accident surgery; the only mess they knew was the plaster mess. They had time to think, and they developed a deep appreciation of the principles of healing, the growth and repair of bone, cartilage, tendon, the mechanism and management of joint and muscle movements. Under the stimulus of necessity their descendants have come to apply this knowledge to a wider sphere—acute traumatic surgery, sepsis, peripheral nerve surgery, the whole field of fracture surgery now comes within the orthopædic domain. But, as TRUETA has written, "With the correct philosophical approach comes the right technique."

In his presidential address to the British Orthopædic Association, published in these columns last week, GIRDLESTONE discussed this influence of the orthopædic surgeon on the treatment of fractures. He urges the young orthopædist to cultivate first an intimate acquaintance with the ways and manners of the mesoblast. Between the fractured bone ends there lies not an inert coagulated lymph plug but living cells that demand blood if they are to survive; and strong skeletal traction strangles such cells. The osteoblast needs the stimulus of "push" if it is to thrive—such stress, as KEITH[1] puts it, "is as necessary for its health as exercise is for the living body." For the fractured femur GIRDLESTONE thus advises fixed extension on the Thomas splint with skin strapping in the old-fashioned way. Much

1. Keith, A. Menders of the Maimed, London, 1919.

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has been written about the ingenuity of this Thomas splint, and KEITH has pointed out how closely it follows nature's method of splinting. In vertebrates there is a central bony support for the limb, whereas in crustacea and insects there is an ensheathing support. The Thomas splint is the sheath with unnecessary parts cut away; in the "Tobruk" plaster, lately described by BUXTON,[2] plaster is used over the Thomas to complete the encircling sheath. When to move or not to move the difficult joint fracture is always a problem. GIRDLESTONE advises early non-weight-bearing movements; thus in the knee, providing the limb is adequately slung, passive exercises can be started in 4–5 days, and active ones a few days later. For the fractured scaphoid adequate reduction is more important than union; he would place the wrist in full dorsiflexion for three months, observing the greatest gentleness in changing the plasters. He thinks the field for grafting the fractured scaphoid but a small one, seeing that even in practised hands the operation is neither always successful nor devoid of risk of carpal damage. GIRDLESTONE painted rather an alarming picture of the Smith-Petersen pin ploughing its way through the femoral head's vascular system. He suspects the pin of being a potent killer of heads, and pointed out that it takes several years for an avascular head to be recast. The most important part of the treatment of the fractured femoral neck is reduction; after that it can be held by the Thomas splint and Pearson flexion piece with Balkan frame extension, and perseverance with this simple method may well give results comparable to those of the pin.

From his experience and wisdom GIRDLESTONE added a warning against "attractive" operations—surgical exercises more fittingly done on the cadaver. The warning is timely, for with modern illustration difficult technical procedures are made to appear simple, and the operator (alas, often the patient too) may find that between the seeing and the doing of the thing there is a hideous nightmare. A patient's implicit trust should not be betrayed by such ill-considered adventures. "The surgeon we want for ourselves and our children is one who will not operate if he can attain his purpose by conservative means, and who prefers a safe and simple operation to one which is attractive to perform, though perhaps a little dangerous." GIRDLESTONE elaborated three freedoms in the treatment of the fractured limb—freedom from pain, freedom from pins, where possible, and freedom of the circulation, remembering the need for subsequent expansion. He might have added freedom of the patient from want. As HENRY COHEN has said, "there are no diseases, there are diseased individuals." The interlocking of orthopædics with the social services, home conditions, employment and compensation is now recognised as part of treatment.

The President's address shows that an orthopædic mind, ably endowed, can add much to the teaching of what is really yet the child of most orthopædic services—fractures. But will the orthopædist of the future have the time to think if he is to control, besides the standard orthopædics, accident services (with all their implications), fractures, nerve injuries, rheumatoid arthritis and rehabilitation, and play his part in what is expected to be his greatest contribution, that of positive health? Life is short, a sigh of the wind says the poet. At the end of his years RUBENS lamented, "Just when I begin to know my art I have to die"—and he only painted! A slow evolution of the orthopædists' position and influence is now taking place; fractures are accepted as coming within their department, but their full control of all accident services (the establishment of a traumatic branch) is still for argument. At the Royal Society of Medicine on Nov. 2 PLATT pleaded for a full place for orthopædists in the basic teaching of the undergraduate. How large that place should be will have to be decided in the near future; perhaps if progress is to be safe it should also be slow—as MONTAIGNE says, it is sometimes wise "to keep water with one oar, with the other grate the shore." In the meantime it would be well if fracture centres took GIRDLESTONE'S advice and made themselves responsible for instructing the doctors in their districts, teaching especially the principles. If these be understood, the craftsmanship of the technique will readily follow. Of immense worth in this war has been the "disciplining" of hospitals by the regional organisation. Such control is not without its risk, and WATSON-JONES at the BOA meeting indicated the dangers of excess. But with careful selection of the right men there is in fact no such risk. The work of the orthopædic regional advisers in this war has been particularly happy and stimulating.

2. Buxton, St. J. D. *Lancet*, Nov. 6, 1943, p. 564.

Annotations

PARLIAMENTARY MEDICAL COMMITTEE

MUCH of the real work of the Houses of Parliament is done without ostentation behind the scenes, and long before the collective voice of medicine was heard in the land there was a little group at St. Stephens conferring how medical issues could best be laid before the legislative assembly. This medical parliamentary group, which includes the medical peers, has made a practice of inviting to its round table one or another non-medical member, such as the late Sir Philip Magnus, whose sympathies were closely identified with medical objectives. More recently some of these elder statesmen have added poise and balance in dealing with wider issues of medicine outside strictly professional matters. With the presentation of the white-paper in sight this would seem to be the appropriate time for widening still further the membership of the group so as to include the various interests which health workers have in common.

"THE LAMP STILL BURNS"

IN producing this film on nursing—in many ways a sound unprejudiced documentary—Mr. Leslie Howard had the help of the Ministry of Health. The clinical details are therefore accurate, though discreet almost to the point of primness. The main interest for the audience lies in deciphering the message of the story—not an easy task, because two distinct propositions are here mated in uneasy union. One is that nursing is a great profession with great rewards; the other that it is grossly marred for many women by unnecessary restrictions on their private lives. Both are true of English nursing today, but in an attempt to do justice to both and offend nobody the film falls into some dangerous trifling with principles. It was a mistake, perhaps, to make the heroine one of the rare women who finds in nursing a true vocation. No question but that such women make matchless nurses, or that they are as stirring to meet as any other man or woman absorbed by an ideal of service: but in our enormous nursing service of today they are

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naturally relatively scarce. They may leaven the lump, but the bulk of our nursing must be done by girls and women to whom it is merely an interesting occupation comparable with school-teaching or secretarial work. Our nurse in the film is dismissed for a trivial piece of rebellion against rigid etiquette, but is taken back because she agrees to accept without question the restrictions which she has just been condemning, with much cogency, before the hospital committee. There is no suggestion—there is not even a hint—that in this surrender of her principles to her vocation she is in a sense betraying the many girls who do not share her passion for her job. And the determination of her (fabulously rich) admirer to fight for the reforms she wants until, as he says, she can have "both a home and a job" has therefore the colour of a forlorn hope: this is a fight which the nurses must wage themselves, not delegate to friends outside the profession.

The film is partly based on Monica Dickens's frank and pleasing book *One Pair of Feet*, but the grooming process of the studio has turned her hobby into a horse of a different colour. She describes with insight and humour the lies, subterfuges and makeshifts to which nurses are driven by off-duty discipline; and the narrowing effect on a student nurse of even one year in hospital is summed up in the following lines:

"Through working to routine and never to initiative your brain becomes like a car with a bad pick-up. It ticks over fast enough to cope with what is required of it, but its acceleration deteriorates until it is almost impossible to rev it up sufficiently to keep pace with anyone not similarly affected. One did not notice this in the hospital, where the conversation was unambitious and the humour unsubtle and chiefly lavatorial, but the moment you went among outside people you felt dull and inadequate."

That kind of truth was missing from the film, no doubt because the aim was partly to attract girls to nursing, not to frighten them off. But so much good acting and sensitive production might have been used more worthily on the theme: "The reforms must come first, the nurses will follow." Perhaps if the Ministry of Information had been invoked, as well as the Ministry of Health, that message would now be singing in the ears of our hospital authorities.

BACTERIAL ANEURYSMS

BACTERIAL (or mycotic, to use the old term which should now be given up) aneurysms are scarce; Garland [1] found only 4 in 12,000 necropsies. In reporting 3 new cases, Chamberlain [2] discusses the 19 others recorded since Stengel and Wolferth's [3] review of 217 cases in 1923. For ingenuity no theory of causation has yet surpassed the original one advanced by Ponfick,[4] that such aneurysms are due to an embolus containing a calcified spicule which perforates the wall of the vessel and thus allows bacteria to enter, but the more generally accepted view today is that of Eppinger,[5] that the aneurysm forms as a result of infection of the vessel wall by organisms carried by the embolus. In the case of larger vessels the embolus may lodge in the vasa vasorum, while occasionally the aneurysm may arise from the direct spread of infection along the intima from neighbouring foci. The rarest form of all is probably that which occurs in periarteritis nodosa. Of Chamberlain's 22 cases, 13 were cases of subacute bacterial endocarditis, the remainder representing mainly a mixed bag of septicæmias. Most of these aneurysms are small, measuring a few c.cm. in capacity, though Gage [6] reported one which attained the size of a grapefruit. The commonest causal organism is a streptococcus, as would be expected from the close association with infective endocarditis; other organisms that have been isolated include the gonococcus, *Bacillus typhosus*, *B. anthracis* and *Brucella abortus*. The order of frequency in which vessels were involved was: aorta 8 cases, pulmonary and mesenteric arteries (3 each), radial, common iliac and middle cerebral arteries (2 each), popliteal, posterior tibial, femoral and axillary arteries (1 each). The average age of the patients was 33 and there was a preponderance of males. The time taken for these aneurysms to develop is difficult to assess; Chamberlain believes that, while the septicæmia is present for a few months before the aneurysm is detected, the aneurysm itself only takes a few weeks to attain recognisable size. Once present it develops rapidly, and death usually follows within six months. A bacterial aneurysm is a grave complication, because of the possibility of rupture or vascular obstruction, but 3 cases recovered in this series. Diagnosis is difficult unless a peripheral artery is involved, and Areta [7] tells of one in the radial artery which was incised as an abscess. One in the aorta was detected radiologically on account of calcification in the sac. Those in the mesenteric artery should always be suspected when an acute abdominal emergency occurs in a patient with subacute bacterial endocarditis, or indeed any septicæmia. Treatment obviously depends on that of the preceding bacterial endocarditis, but in this series 2 cases responded to ligation of the aneurysm during a quiescent phase of the endocarditis.

AFTER MENINGITIS

No uniform psychiatric findings have been reported among patients who recover from cerebrospinal fever, and the syndrome described in 1918, as a result of observations on 26 patients at the US Army Hospital at Plattsburg,[8] has been neither confirmed nor refuted by subsequent observers. The symptoms noted then included limitation of flexion of the spine, easy tiring, pains in the back, legs and head, dizziness, faintness, muscular weakness, blurred vision, photophobia, and poor sleep, appetite and nutrition. Dr. M. N. Pai, feeling that the 1940 epidemic afforded an opportunity of settling this question, collected at a neurosis centre a group of 32 patients who had had cerebrospinal fever between 1939 and 1942. In reporting this series to the psychiatric section of the Royal Society of Medicine on Nov. 9, he said that their ages ranged from 18 to 31, and he classed them into three groups, according to whether their previous personality was good (stable people with hobbies, friends and good work records), fairly good (timid and dependent people with fair work records), or neurotic (hysterics, psychopaths, borderline mental defectives, and neurotic people with poor work records). There were 14 cases in group I, 7 in group II and 11 in group III, yet in only 7 cases in all (4 in group I, 1 in group II and 2 in group III) could the neuroses be regarded as the late results of encephalopathy; in the remaining 25 the symptoms appeared to be psychogenic. In the 7 cases thought to be organic the attacks of cerebrospinal fever had been severe and associated with delirium.

The onset of neurotic symptoms (whether organic or functional) followed unusual stress in 2 cases in group I, 3 cases in group II and 7 in group III; similar symptoms had been present before the attack of meningitis in several of the patients in both the last two groups. In all three groups the symptoms included depression, headaches, memory defects and personality changes; but hysterical symptoms were common in groups II and III and rare in group I. In the 7 patients with symptoms attributed to organic lesions the common findings were: mild, persistent depression without self-reproach, frontal headaches, forgetfulness, invalidism and a change of personality towards timidity, restriction of interests and

1. Garland, H. G. *J. Path. Bact.* 1932, 35, 334.
2. Chamberlain, E. N. *Brit. Heart J.* 1943, 5, 121.
3. Stengel, A. and Wolferth, C. C. *Arch. intern. Med.* 1923, 31, 526.
4. *Virchows Arch.* 1873, 58, 528.
5. Eppinger, H. *Arch. klin. Chir.* 1887, 35, Suppl. 1.
6. Gage, I. M. *Amer. J. Surg.* 1934, 24, 667.
7. Areta, T. *Sem. méd., B. Aires*, 1935, 42, 645.
8. Rosanoff, A. J. *J. Amer. med. Ass.* 1918, 71, 1476.

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lack of self-confidence. Some degree of intellectual deterioration led to poor learning ability and difficulty in recalling names, forming new associations, and planning ahead. The 4 organic cases in group I were followed up, and the symptoms have so far persisted. All 32 were Service patients, and 16 of them were invalided out sooner or later; only 3 returned to full duty, and these had all had mild attacks. None of those who had had a severe attack returned to duty. It is noteworthy that the recovery-rate among this group of 32 was not so high as that among other neurotic patients (with no history of meningitis) in the centre at the time.

Dr. Stanley Banks suggested that it would need a longer follow-up to decide whether symptoms were likely to be permanent. Headaches following meningitis often disappear, he said, after about 18 months; the other sequelæ might subside in the same way.

OPHTHALMIA NEONATORUM

THE fear that the present upheaval would bring an increase in blindness from ophthalmia neonatorum has fortunately proved illusory. Speaking last week before the section of ophthalmology of the Royal Society of Medicine Prof. Arnold Sorsby said that on the contrary there has been a gratifying decline. The annual returns of the Ministry of Health show that the number of children blinded from ophthalmia neonatorum for the seven years 1934–40 was 44, while there was only one for the two years 1941–42. The incidence of impaired vision has likewise declined, the figures being 190 and 14 for the two periods. As there is no reason to believe that the incidence is substantially lower, it is likely that the improvement today is largely due to sulphonamide therapy.

Blindness from ophthalmia neonatorum has been diminishing steadily throughout the present century. It constituted 18·0% of all causes of blindness in children passed for London County Council blind schools during 1907–13 and had declined to 11·9% in the period 1914–20, as Mr. Bishop Harman showed in 1922 in the Ministry of Health's final report on the Causes and Prevention of Blindness. In 1931 21·1% of children at LCC blind schools were blind from this affection; by 1938 the proportion had fallen to 14·0% and this year it was 9·8%. That ophthalmia neonatorum is nevertheless still to be reckoned with is seen from the fact that at least 15 out of the 127 infants under the age of 5 years at the Sunshine Homes of the National Institute for the Blind were blind from it. In fact, as Mr. Sorsby stressed, though blindness from ophthalmia neonatorum has declined steadily, the decline has not been so steep as for blindness from other infectious disease, and especially from congenital syphilis. An analysis of the distribution of babies with impaired vision and blindness from ophthalmia neonatorum shows that the situation in the LCC area is more satisfactory than in other county council areas and county districts, and distinctly better than in the county boroughs and Wales, though improvement has been evident throughout the country.

There is as yet no standard prophylaxis in ophthalmia neonatorum. Emphasising the paramount importance of adequate antenatal care Mr. Sorsby reported that inquiries addressed to the larger lying-in centres showed that the incidence of gonococcal ophthalmia was no less at centres using silver nitrate than at those using organic silver. In 70,386 births at which silver nitrate was used 64 cases of gonococcal ophthalmia had occurred, while in 39,432 births at which 'Protargol' was used there were 21. On the other hand in Scotland, where silver nitrate is recommended for routine use by the Scottish Central Midwives Board, the incidence of blindness from ophthalmia is distinctly lower than in England and Wales (0·23 against 1·25 for 100,000 births during 1934–38). Whatever difference of opinion there may be on prophylaxis, Mr. Sorsby's report on 500 cases of ophthalmia neonatorum treated by him at White Oak since January, 1940, made it clear that in the sulphonamides we have a therapeutic agent which makes blindness or impaired vision from this affection no longer tolerable.

HYPOGLYCÆMIA AND THE HEART

HYPOGLYCÆMIA in its time has been held responsible for many obscure symptoms, principally on account of the relative ease with which blood-sugar estimations can be carried out. Most of these bubbles have been evanescent, so that fresh claims are received cautiously by the experienced. Harrison,[1] however, whose investigations into the biochemical changes in heart-failure are outstanding, now offers a case for a syndrome in which disturbances of cardiovascular function are associated with hypoglycæmia. "Relative hypoglycæmia," he suggests, may be responsible for, or at least play a part in, precipitating various cardiac symptoms. Such attacks never arise less than an hour after a meal, they can often be reproduced by giving insulin, and they can be relieved by glucose. Neither the fasting blood-sugar findings nor the glucose-tolerance curve are characteristic, but there is a tendency for the blood-sugar to be at the lower limits of normality during fasting, and to drop rather suddenly during the glucose-tolerance test to an unusually low level in 2–3 hours. The symptoms characterising the syndrome are nervousness, weakness, palpitations and pain in the chest. The last is usually a vague precordial discomfort not comparable to anginal pain, though in some patients with angina pectoris typical attacks of pain occurring at rest seem to be precipitated by such relative hypoglycæmia. Among associated cardiac disturbances were hypertension, cardiac neurosis, arteriosclerotic heart disease, paroxysmal tachycardia, paroxysmal auricular fibrillation and hypertensive encephalopathy. The condition, according to Harrison, is not rare—it was diagnosed in 31 of the last 204 of his patients with cardiovascular complaints. The treatment is by a diet low in carbohydrate and with a high protein content. Spontaneous hypoglycæmia with loss of consciousness and convulsions is a familiar story; and it is equally well recognised that hypoglycæmia often affects the coronary circulation unfavourably in middle-aged patients. Thus it is a principle in treatment that no middle-aged or elderly diabetic must be allowed to develop hypoglycæmia; the blood-sugar should rather be kept at a relatively high level to avoid the risk of precipitating coronary thrombosis. The syndrome which Harrison describes is much less ostentatious in its manifestations; and it seems to have a threefold significance. It may explain cases where, at present, no precise cause can be found for the cardiac symptoms or signs. In established disease—for example in angina pectoris, hypertension or even paroxysmal dyspnœa—it may explain such exacerbations as pain at rest in patients with angina pectoris or attacks of encephalopathy in patients with hypertension. Finally it may allow us to distinguish one group among the heterogeneous unfortunates labelled "cardiac neuroses." Harrison makes no claim to have proved his thesis, but he has made out a case for investigation.

The DUKE of GLOUCESTER has accepted the honorary fellowship of the Royal College of Surgeons of England.

Mr. HENRY URMSTON WILLINK, KC, the new Minister of Health, is the son of an architect and son-in-law of Dr. H. Morley Fletcher. He has been special commissioner for the London Region since 1940, which includes the blitz, and is still in his forties.

1. Harrison, T. R. and Finks, R. M. *Amer. Heart J.* 1943, 26, 147.

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Special Articles

RELIEF IN EUROPE

A MEETING of the English group of the Nutrition Society was held at the London School of Hygiene and Tropical Medicine on Nov. 6 to discuss scientific and medical aspects of postwar European relief.

Lord HORDER, who presided, suggested that the United Nations Relief and Rehabilitation Administration (UNRRA), established by the governments and authorities of the united nations to provide adequate relief as soon as the war ends, should be given an opportunity to plan for production so that there will be an adequate supply of materials for aid.

Prof. J. R. MARRACK, chairman of the committee for coördination of nutrition surveys, pointed out that inability to import food for direct human consumption from overseas accounted for only a small portion of the deficiency of food in Europe at the end of 1918. The chief reason for the shortage was that the continent produced much less food. This was due to lack of labour, scarcity of fertilisers and the killing off of livestock, as well as the fact that retreating soldiers had stripped the country. Peasants who had left their farms found on their return that the land was covered with grass and young trees. The precarious political and military situation in Europe after the Armistice, he said, made individual states hesitate to trade with each other and this made the general food situation much worse. Food was provided as relief by means of special credits or paid for in cash by the Governments of the countries receiving it. It was distributed through the normal channels of trade in the way that supplies procured by our food controller are distributed in this country at present, or through local authorities. The total amount of food, including relief, imported into European countries, other than those of neutrals and the western Allies, were considerably less during 1919 and 1920 than during 1913, even though food production in these countries was reduced. The total amount of flour and grain (4 million tons) supplied as relief was not enough to make up the deficiency in wheat and rye in Germany alone. Altogether only just over a sixth of the calories were derived from food supplied as relief, and only those children who showed signs of undernutrition were fed under the child feeding programme. Nevertheless at the peak period 3¼ million children were being fed. Thus, though the relief supplied appreciably reduced suffering, the amount of food supplied did not provide even sufficient calories, and relief on a large scale ended too soon. Nor was the quality of the food used for relief satisfactory: the greatest deficiency was in animal products, 60% of the relief food was in cereals, and the amount of condensed and evaporated milk sent was small. The foods provided for feeding children also contained too little milk, and no meat. The total food supplied in relief in the five years 1919–24 was less than the sum of imports of wheat and flour, meat, bacon and ham, and sugar into Great Britain during the one year 1918, when our imports of food were cut to a minimum. The amount of pork products was under two-thirds of our imports in that year and one-tenth of the total consumption of pork products in the USA in 1919. In fact only surplus foods, particularly grain and pork products which the USA had been raising in large quantities to meet Allied demands during the war, could be obtained for relief and these goods were sent whether or not they met the physiological needs of the recipients.

Dr. KARL EVANG, the Norwegian director-general of public health, pointed out that an outstanding deficiency after the last war was in fat, and it is again seriously deficient in Europe at the moment. Craving for fats, he said, causes violent suffering; and scarcity of food has a grave effect on mental health, underfed people becoming indolent and oppressed by feelings of inferiority. The food situation differs in this war from that in the last war in that we now have a clear appreciation of 3 important nutritional factors:

1. The rôle of vitamins in the development of deficiency disease.
2. The relationship between deficient diet and the development of tuberculosis.
3. The fact that people who have existed for some time on a poor diet are less resistant to disease in general.

A difficulty in assessing the degree of malnutrition is the lack of criteria indicating when an individual passes into the danger period. Hunger œdema is appearing now in Norway: that it is due to lack of proteins in this case seems doubtful because fish is still available in most parts of Norway. He mentioned four important practical principles to bear in mind in feeding Europe after the war:

1. People will want calories first.
2. There is a strong tendency to treat all countries the same, but the standard of nutrition in each country should be taken into account in giving food priorities.
3. The peoples in each occupied country as it is liberated will want to join in the fight and they will not understand if they cannot immediately get enough food to bring them up to fighting strength.
4. Large amounts of fat and protein could quickly be obtained from the sea by mobilising the fishing fleets.

Mr. GEOFFREY H. BOURNE, D SC, gave a comparative account of the present food situation in Europe. There is acute starvation and famine in parts of occupied Russia, in Eastern Poland, Croatia and Greece. The rest of Europe is stabilised at a calorie level of about 1000–1500 calories. There is a gross shortage of fat and provision of fat will be the greatest single difficulty after the war. The food deficiencies suggest a serious lack in vitamins A, D and C, riboflavin, and calcium. There are already reports of rickets, scurvy, failure of surgical wounds to heal, fragile bones, anæmia and hunger œdema. The low calorie intake (below the accepted basic level) on which many millions of people in Europe are now existing shows that the body is able to adapt itself to lower calorie levels than has been thought possible.

Mr. JOHN HAMMOND, FRS, of the inter-allied technical advisory committee on agriculture, said that the extent of the relief needed would depend on the time available for the enemy to put the scorched earth policy into effect. A minimum amount of food should be given to all countries before any is raised to a higher standard. Meat takes five times as much land as is needed to produce the same number of calories as wheat or potatoes. Therefore in the beginning wheat and potatoes must be given priority in European agriculture. Apart from these two, the greatest amount of food per acre can be obtained from sugar-beet, and rye where there are light acid soils. Tractors, seed and fertilisers will be needed. The chief fertilisers will be phosphate and nitrogen and probably potash. Importation of fertilisers will actually be a saving in shipping space because they will produce 3 times as much food as can be brought in by the same amount of shipping. The greatest deficiency is in animal foods, and it will probably take 8 years to get the production of animal foods back to normal. Attention should first be given to the reconstitution of dairy herds. The milk obtained in this way will be urgently needed to supplement the cereals and potatoes which will make up the greater part of the diet for some time. Slaughter of any female cattle capable of breeding should be prohibited and artificial insemination should be used as widely as possible. Meats and fats should be imported in a form in which they will be easily transported and stored. Oils can probably best be sent as seeds, and the residue from the seeds could be used for animal food, thus helping to increase milk production. Meat should be dehydrated or tinned. Overseas meat-producing countries should now be accumulating reserves of meat prepared in these ways.

Dr. AUDREY RUSSELL, member of the Central Council for Refugees, noted that the relief problem today had grown beyond the scope of voluntary bodies. It is important, she believes, to distribute relief in such a way that those receiving it are made self-confident and not treated as helpless people. Refugee camps should accommodate not more than 5000 people in each, and those entering them should be subdivided into groups of 1000 people. There should be mobile and fixed canteens and loud speakers to direct refugees on the road. Refugees travelling back to their own countries should receive rest and attention at transit camps. In the schools of Barcelona during the Spanish war children were graded into three groups according to their nutrition, and given different periods of rest, voluntary activity, and lessons. This is a

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much better plan than transferring the most debilitated children to camps away from their families; camps are only needed for orphans and strays.

Prof. EDMUND NOBEL, formerly professor of children's diseases at the University of Vienna, described relief work in Austria in the last war and said that staffs of relief feeding kitchens were given a two months training in nutrition. He described Pirquet's method of assessing nutritional requirements in children.

Miss E. M. M. HUME, of the Lister Institute, described the expedition led by Miss Harriette Chick, of which she was a member, to Vienna after the last war. Rickets, scurvy, war œdema and adult rickets were prevalent in Europe. The adult rickets was found to be curable with cod-liver oil, and the expedition was able to solve the problem of the ætiology of infantile rickets.

Dr. A. P. MEIKLEJOHN, of the Oxford Nutrition Survey, said that trained nutritional teams could now go into an area and bring in a relatively good assessment of the average nutritional state in a short time. They had many more aids for this purpose than had expeditions to Europe after the last war.

In summing up the conference the chairman insisted that we must not underestimate the size of the problem which lies before us. He hoped that it would be possible to reduce our own rations a little after the war in order to provide more for our fellows in Europe whose need will be greater.

PHARMACISTS IN THE ARMY

THE Pharmaceutical Society of Great Britain, of which all pharmacists are members, is dissatisfied with the position of pharmacy in the Royal Army Medical Corps. In a memorandum sent to the War Office last year the council of the Society recalled that in August 1918 a RAMC committee recommended that pharmacists of commissioned rank should be employed as inspectors and instructors and that one such officer should be attached to each of the larger bases abroad and to each Command at home. Later a committee formed jointly by the War Office and the Pharmaceutical Society advocated that pharmacists should have charge of dispensaries of hospitals of 100 beds and over, and that a pharmacist commissioned officer, not lower in rank than a captain, should be appointed at the War Office to act in an advisory and inspectorial capacapacity:

"That the experience of the last war should have confirmed the principle that the medical supply system should be controlled and operated by pharmacists is not surprising since this principle not only governs civilian conditions but is observed generally in foreign armies. . . . What is surprising is the fact that the experience and lessons of the last war should have been so largely ignored by the military authorities."

Though the enlistment of pharmacists, as sergeant dispensers, during the present war has prevented the grave results which attended the employment of non-pharmacists upon dispensing duties in the last war it does not signify a change of attitude.

"When the Army Council agreed to fill war-time vacancies for sergeant-dispensers by pharmacists it was made clear that they were not to be employed as pharmacists but were required only for such duties as were performed by holders of the Army Dispenser's certificate. The decision therefore was not a recognition of pharmacy but a means of obtaining personnel without the necessity of training them."

"Moreover no payment or other advantages are available to pharmacists which are not available to non-pharmacist dispensers. The War Office view in effect always has been and still is that the pharmaceutical requirements of the Army are too simple and stereotyped to provide scope for the practice of pharmacy; that there is no need for the services of pharmacists as such in the RAMC, and that for dispensing all that is required is the Army Dispenser's certificate. . . . The approach to the subject is indicated by the classification of dispensing as a 'trade'."

Dispensing, in the society's opinion, is not work for which non-pharmacists can assume responsibility, though they are capable within limits of acting as assistants to pharmacists and performing certain operations under supervision. Such persons, if employed at all, should not be called dispensers. To the argument that the retention of control in medical hands offsets the disadvantages of the subordinate personnel being non-pharmacists, the society replies that if the pharmaceutical work done by non-medical personnel is carried out or supervised by pharmacists there is no occasion for medical supervision; secondly that medical practitioners do not possess the knowledge which renders them competent to direct policy and supervise pharmaceutical work; and thirdly that in the Army at present the full potentialities of a pharmaceutical service are not and cannot be developed. So that the services of pharmacists may be used to better advantage, the society puts forward various proposals, including:

1. A Directorate of Pharmaceutical Services, with a pharmacist director, should be established at the War Office. It would be concerned with medical supplies, the organisation of pharmaceutical work in the RAMC, the utilisation of new knowledge, the preparation and revision of pharmacopœias and formularies, the pharmaceutical equipment of medical units and the training of all pharmaceutical personnel. Corresponding to this directorate at home there would be subsidiary directorates in the overseas theatres of war.
2. The officer in charge of Command medical stores and his assistants should be pharmacists with commissioned rank. This also applies to mobilisation stores and base stores overseas. In addition to the personnel at the Command medical stores there should be a pharmacist exercising a general oversight of the pharmaceutical affairs of the Command.
3. The pharmaceutical work of each general hospital and the work of the medical stores attached to it should be combined as the "pharmaceutical department" of the hospital, in charge of a pharmacist with as many pharmacist assistants as the size of the hospital makes necessary. These should have commissioned rank. At casualty-clearing hospitals the same principles apply.
4. Each field ambulance has attached to it two sergeant-dispensers who under war-time conditions are generally pharmacists. They are employed largely on general duties, while medical officers spend much of their time upon duties which could be equally well performed by pharmacists. The pharmacists should be given commissioned rank, and should share in the general duties of officers of the unit. They should also be responsible for medical stores and such matters as bandaging and minor dressings, stretcher-drill, passive air defence, camp hygiene, camp reception stations, and adjutant's duties.

"The main point" of the proposals, it is stated, is to ensure "that medical supplies from the time of entering the RAMC until they are used are under the control of pharmacists who have the necessary authority to carry out all those functions which are their special province or for which they can be employed with advantage." The society believes that, given proper recognition and scope for the exercise of their calling pharmacists can make a valuable contribution to the strength and efficiency of the RAMC. It accordingly proposed that a joint committee of the society and the War Office be appointed to work out a comprehensive scheme without delay.

This proposal has been rejected by the War Office. A letter dated March 19 states the Army Council's opinion as follows:

"The arrangements for the provision and supply of drugs, dressings and other medical supplies for the army in all theatres of war under War Office control are in the Council's view entirely satisfactory and after three and a half years of war there has been no breakdown or criticism of these arrangements despite the extremely difficult supply and other conditions encountered. The Council are fully satisfied that the services of pharmacists who are posted to the army as such are utilised in the Royal Army Medical Corps to the fullest advantage in their employment in the duties of the army trade of dispenser. The Council are unable to agree that any changes are necessary in the existing army organisation and therefore regret that they cannot accept the suggestion that a joint committee of the Pharmaceutical Society and the War Office be appointed for the purpose of enquiring into the matter."

This decision is reaffirmed in a letter dated Sept. 18, and permission has been given to publish the correspondence.

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In England Now

A Running Commentary by Peripatetic Correspondents

THE hall was packed for the RSM penicillin meeting. It was said to be the biggest crowd seen there since Sir Almroth Wright's vaccine meeting in 1909. "I thought the war was over," said one of the porters, "seeing so many doctors with a free afternoon." Incidentally, though the BBC and Dorland's Dictionary put the accent on the second syllable, I noticed that Professor Fleming, who coined the word, called it penny-*sil*-in, with the accent on the sil.

* * *

Like many other holders of administrative posts I sometimes wonder why I ever bothered to qualify. What a time we spend in dealing with human nature! Strictly speaking I suppose we are "physiologists," for the Greeks had this name for us. My heart slips down between the domes of the diaphragm every time someone says, "May I have a word with you, sir?" It always means that somebody is touchy about something. And yet because we have qualified in medicine and seen the best and worst of life I believe we are the better suited for dealing with the minor disturbances of happiness brought about by human eccentricities.

Why are people difficult? What induces resentment? As with the common cold the sexes are affected equally and no age is exempt. Awkwardness may be the result of inferiority or shyness but "cussedness" is, I think, a projection of jealousy. A financial motive is not by any means always behind this trait. When, in a small town, the opposing firm of practitioners "don't get on very well together" it might be thought to be an expression of the primitive instinct of self-preservation—an underlying fear that the other fellows intend to take away all the patients. But this can't be the whole story because jealousy can operate in whole-time workers whose jobs are secure and who have nothing to gain or lose. Let our medical reformers remember this. What then is the cause of this often noted jealousy? It seems likely that we strive for power as Nietzsche supposed, and this may be why the shy person is often difficult; it is one way in which he can assert himself. There are many ways of achieving power. The man who is endowed with a weak personality may develop charm and a gentle manner and thus get his own way, for "the gentle answer turneth away wrath." The strong man, on the other hand, can afford to be both tough and gruff.

What about other creatures? Do cows try to assert themselves? This summer on the farm I watched some but never once did Clothilde take exception to the landgirl milking first the more recently acquired Hilda. They are peaceful creatures and certainly cowlike. Not so the two spaniels, for they show their jealousy when the occasion arises, but they are never awkward about it. One day Peter saw me give Piper a particularly succulent articulation, a present from the butcher, but he never attempted to "take it out of me" or Piper, and ten minutes later they both frisked after me on a walk. The most jealous of creatures is Lola, a fascinating young acquaintance of mine. Although but seven months old, this beautiful Siamese cat will go off her food if the slightest attention is paid to the black and white, who on the score of years and residence is the senior of the two, besides being incomparably the better mouser. I wonder if she is jealous because of an inferiority complex. Perhaps Lola's treatment of Whisky has its origin in her ancestors' enforced sojourn in the company of humans in the Ark. In any case Noah's difficult task of selecting couples can hardly have been accomplished without a certain amount of feeling.

* * *

The High M— Coke Hunt is anticipating public appreciation by the Minister of Fuel. Severe fuel rationing precluded an issue of coke for our private rooms in huts, so Mac our MOH (Master of Coke Hounds) sallied forth and started to sort over our foundations, which had been obtained from a gas-works. Success was immediate and a rich seam struck. I returned from leave and together we hunted more distant country—the gas-works ballast we were obtaining for our car park. Our predatory eyes and nimble fingers enabled us to pick an evening's supply in half an hour. We have become connoisseurs and scorn the small plentiful fragments. Rather do we go for the "collector's" pieces and display them to each other, congratulating each other as enthusiastically as combatants at Wimbledon. I can now understand the thrill of digging out such a diamond as the Koh-i-noor. The feelings of the troops are best expressed by the comment of one who said, during one of our drives, "I've never seen officers picking coke before," and after a pause, "They'll be giving you guards next." For those who feel attracted to the sport I would advise starting after rain in a good light. The coke then shows up much darker than the clinker. I am shortly publishing an advanced and authoritative manual entitled *Lesser known slopes of the Port G— Coking Country.*

* * *

A Fascist police HQ makes an admirable officers' mess. Fortunately we arrived just as the decorators were putting the finishing touches to the rooms. The tiled bath-rooms were a joy to behold, clean and cool from the ceilings down to the wc's (which had not been fitted with wooden seats). We even have an anteroom. Comfort such as this cannot last. No doubt the site for the building has been carefully chosen so that the arm of the law can be exercised to the greatest advantage. The surrounding dwellings are dirty and squalid. In the distance the pastel shades of the walls of the houses look very beautiful against the fading blue of the evening sky. Distance lends enchantment hard to recapture on closer inspection. Even in this genial climate, plaster is hardly robust enough to withstand fair wear and tear; it is cracked and chipped, and inevitably the children use the distempered surface for their running commentaries on one another—amorous or libellous—appropriately embellished with sketches. Even Agag would have quailed at the prospect of making his way from the mess to the company office half a mile away, so numerous are the hazards in the form of rotten fruit, garbage, entrails of fowls, household slops, stinking rivulets of purple fluid oozing from decrepit sheds where "vino" is made, and the small mounds of human fæces deposited daily by unwashed half-naked children who tumble about in the gutters. Opposite my bedroom window is a wall which conceals from view a kind of courtyard. One day when the owner of the property was sunning himself in his chair by the open door I peeped inside. I was astonished to see a farmyard: there were pigs, hens, rabbits and a couple of cats, and on the walls numerous birdcages well stocked. The surface of the yard had been converted into an evil-smelling quagmire of mud, straw and the usual variety of ingredients found in the farmyard. Little wonder that we have had to fly-proof our windows. One evening when the window had been left open I counted over 100 flies "parked" for the night on a piece of string 6 ft. long. While I share the doubtful privilege of living with this imperial race I will always keep a box of sulphaguanidine tablets in my small pack.

* * *

The most enviable capacity in medicine, from a purely selfish point of view, must be the ability to gloat over the successes and ignore the failures. Maybe I am too young, or maybe I shall never learn it, but at present the successes always seem to me natural and the failures disastrous. One death wipes out ten contented discharges. Moreover this makes for very gloomy weekends, for the Angel of Death invariably walks—and it cannot be coincidence—when my chief is beagling and my immediate superior playing hockey. The patients come in doing something appalling and they die before I can obtain succour, or for that matter send for the doctor. Moreover they die with some inevitability; it is inconceivable (Dr. Johnson?) with what rapidity they advance towards death. If they seem to be doing all right for a few hours, at the end of that time they sit up abruptly, look appalling, cast up their eyes and perform that horrible gasping respiration of the already dead. Last week it was a man who bled from his epiglottis and his lungs, a girl who had never been ill in her life and died in two hours from a hæmorrhage into a glioma, and a man with a whacking great carcinoma of the bronchus. It was all quite reasonable in the PM room, but personally I think that if they hadn't all been out the girl wouldn't have *had* a glioma. Oh alas; as a Welsh lady said to me in a train when thinking of the rigours of life under canvas. Now it is the weekend again, and already a uræmia has dropped off the hooks.

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Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

THE changes in the Government announced since the rising of the House will not be the subject of Parliamentary comment until the new session opens. It now falls to Mr. Willink as the new Minister of Health to expound the white-paper on the medical services which is soon to be issued. It is a task which no-one will envy him.

Owing to a last minute rearrangement of business the House was called on to debate at almost a moment's notice the incidence of tuberculosis and the allowances available to curable cases. Mr. Ammon for the Labour Party made an excellent statement on the general position and referred to his own experience of the disease among the Post Office service in which he once served. People used to look round their offices, he said, and "almost be able to tell who was going to die next." The tuberculosis situation has improved over the last twenty years, but the increase in the war has brought the matter up again, and criticism on all sides was vigorous. Mr. Clement Davies who conducted an inquiry into tuberculosis in Wales in 1937 told how the three worst affected counties were Anglesey, Carnarvon and Pembroke, and denounced malnutrition, bad housing, and bad conditions in schools, factories and mines, as the chief causes. Dr. Summerskill, talking of "inhuman and callous treatment," said that the allowances were less than public-assistance rates, and rejected with scorn the idea that for 10*s.* a week the services of a sick housewife could be replaced.

The Ministry's case was that these allowances for curable cases were "an experiment," but the general opinion of members was that the experiment was ill conceived and that to exclude chronic and incurable cases was an untenable position. Mr. McNeil quoted a letter from "that most sober journal, *The Scotsman*," which said that "the scheme appears as a piece of cold-blooded expediency designed not for the relief of mental or bodily sickness but purely as a measure towards alleviating the man-power shortage." Mr. McNeil added that in Scotland one out of every three cases applying for allowances had been refused. Time did not allow as full a discussion as the subject merited, but it was plainly the opinion of the majority that while allowances for curable cases were useful—although some thought the amounts inadequate—yet to leave the chronic and incurable cases at home or at work infecting others was an irrational and inhuman procedure. Mr. Westwood, who replied for the Government, pointed out the difficulties of the situation—shortage of beds, shortage of staff, and shortage of facilities for early X-ray diagnosis. But if a proportion of beds reserved for EMS purposes were released and if a vigorous drive for more nurses were made the situation would be at least improved. The House is now alive to the menace of tuberculosis, and the new Minister of Health will certainly be asked to tackle it with more vigour.

FROM THE PRESS GALLERY

Exaggerated Claims for Foodstuffs

IN the House of Commons on Nov. 9, Mr. W. MABANE, parliamentary secretary to the Ministry of Food, stated that a white-paper (Cmd. 6482, 1*d.*) had been issued explaining the regulations made to enable the Ministry to protect the consumer against false and misleading claims regarding the quality of foodstuffs. There had been so far no power to prevent exaggerated claims being made for products which, though harmless, had low nutritional value and which carried labels grossly misrepresenting the nature of the product. The Government were of the opinion that the consumer was entitled to protection against such claims. With the reduction in the quantity and variety of food-supplies available it was necessary to provide this protection, especially for products intended for mothers, children and adolescents. The only additional power conferred by these regulations was included in regulation 2 which restricted "the making in advertisements of food of claims or suggestions of the presence in the food of vitamins or minerals." During the war, said Mr. Mabane, the Government had given continuous attention to nutrition. It was unfortunate that a small minority of manufacturers should have been tempted to exploit the national nutritional policy. Reputable food manufacturers, no less than scientists and members of the medical profession, recognised the harm that was being done by misleading advertisements and it was with the object of bringing them to an end that the new powers had been taken. The enforcement of any orders issued under these powers would be entrusted to local authorities, but they would be required to obtain the consent of the Minister of Food before proceedings were taken.

Tuberculosis and the Exchequer

On the motion for the adjournment in the House of Commons on Nov. 10, Mr. C. G. AMMON called attention to the incidence of tuberculosis. He said that he could think of no stronger indictment of our social and economic system than that tuberculosis was still the chief destroyer, apart from the war, of human life in its prime. Yet in a properly ordered society it would be possible to stamp out this scourge, because it arose largely from lack of nutrition, over-fatigue, excessive drinking, poor ventilation and lack of exercise. Postwar planning for housing and medical services must take heed of this, and expense must not be allowed to stand in the way of the provision of facilities for early diagnosis, and more accommodation in sanatoriums. The Ministries of Health and Labour must see that the necessary staff was supplied. In chronic cases something could be done by care and training in habits that would help to restrict the infection, but as time went on he hoped that unreasoning sentimentalism would not be allowed to prevent the separation of chronic cases from the rest of the community. Proper allowances should be provided for both recoverable and non-recoverable cases. It was a matter of concern to the whole community that the health and economic conditions of these patients should be preserved, for tuberculosis was still the greatest potential danger in our midst to human life.

Mr. CLEMENT DAVIES said that even now our laws are in the main passed for the protection of property and not for the protection of persons. Sir HENRY MORRIS-JONES urged concentration on housing. He thought the blackout had aggravated tuberculosis. The nursing service in this country had as high a standard as any in the world in regard to ability and devotion, but the conditions of nurses and other hospital staffs here were not as good as those in many other countries such as New Zealand, Sweden and Norway. Dr. EDITH SUMMERSKILL criticised the new scheme of allowances. It was deplorable, she said, that so many patients should return home to infect their families who in turn had to be found accommodation in sanatoriums. She had been surprised and horrified to discover that these allowances were to be given only to those patients who were considered curable. This meant that if a patient was told that he was not to receive an allowance he interpreted that as a death sentence. Everybody knew that the allowances were inadequate.

In the debate members of all parties supported Mr. Ammon and laid special stress on the restriction of the new treatment allowances to cases regarded as curable. This policy was held to place an unfair responsibility on the medical profession and instances were given to show that doctors resented the duty imposed upon them. Mr. F. S. COCKS quoted a letter, issued by the public-health department of Notts, which said that the limitation in the terms of memo 266D excluded a considerable proportion of tuberculous persons from benefiting under the new allowances and "imposed upon the officers concerned with its administration a duty which from a purely humanitarian point of view is very distasteful." Mr. H. MCNEIL complained that when questioned on this matter in the House, the Minister of Health had sought to escape by saying that he acted upon the findings of the Medical Research Council committee set up to inquire into the matter last autumn. But that, said Mr. McNeil, was not sufficient. If a minister intended to cite an authority to the House he must explain why the authority should be accepted. In this case examination of the authority would not provide an escape. This same report provided for the treatment and employment of chronic pulmonary tuberculosis cases which were now

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excluded from the scheme. One other possible reply was that the primary purpose of the scheme was to restrict the spread of infection. That, he agreed, would be an excellent basis; but Mr. Brown could not believe that that was happening under this scheme. Mr. G. MATHERS quoted letters from two nurses who had contracted the disease in the course of their nursing and were not considered to come within the scope of the scheme for remedial treatment which would enable them to get back to work.

Replying for the Government Mr. J. WESTWOOD said that thirty mass radiography sets were to be provided, three of which were for Scotland. They were trying to develop mass radiography as fast as the limitations of war conditions permitted. They were also trying to face up to the problem of nursing and domestic staffs. He believed that if it was possible to get in our schools a well-balanced midday meal free—and he was working towards that—they would have gone a long way towards improving the health of the children. The tuberculosis scheme arose from the recommendations of a committee on tuberculosis in war-time appointed by the Medical Research Council at the Government's request in the autumn of 1941. The committee recommended the use of mass radiography and the provision of special financial assistance to induce patients to accept early treatment. It was still the duty of the local authority to be responsible for the tuberculosis treatment, but when the medical officer decided that a case was able to respond to the treatment the state bore 100% of the cost of the allowances. So there was nothing to hinder local authorities providing exactly the same allowance for the other cases. The money could come out of the provision for payments to sick persons under the health account authorised under the 1929 Act. But he could not go as far as to say that they would take on the dependents. The local authorities could also make special discretionary allowances and the Exchequer reimbursed them, both in Scotland and England, to the extent of 100%. He did not claim that the new scheme was perfect, and he admitted that it did not apply to all. Its main purpose was to rehabilitate those who could be rehabilitated. There was considerable latitude, and the scheme was only in an experimental stage. The Government were watching its working with a view to making such improvements as were possible within the limitations imposed by available hospital resources. Pressed by Mr. COCKS Mr. Westwood said he could not promise to include incurable cases. He hoped that incurable or chronic cases would come within the general security scheme for all diseases. 'It is not a crime to start in the right direction, he affirmed, and we have started.

Starving Europe

Mr. R. R. STOKES in the House of Commons on Nov. 10 made a strong plea for more foodstuffs to be sent to Greece and that something should be done to provide essential medical supplies and vitamins for nursing mothers and small children in Belgium. The request, he pointed out, was for controlled relief. He did not want to do anything that would help the enemy, but had yet to learn that there had been serious abuse of relief supplies. There was no ground for saying, particularly in the case of Belgium, that medicinal stores, dried milk and vitamin tablets would help the enemy, or relieve him of another of his responsibilities. These countries were not normally self-supporting and he thought it was not generally realised that we get a considerable amount of supplies from such places as the Belgian Congo. Unless we did something, surely when the war came to an end the only well-fed, sleek people would be the Germans: all the populations friendly to us would be down and out and starving, and they would hate us and be quite unable to govern Europe. There was a huge body of opinion in America and this country that wanted the Government to do something to help the children and nursing mothers in Belgium, and to give a little further relief to the starving people of Greece, showing that we really were fighting for Christian principles, and that we recognised that these people were our Allies, and were entitled to some substantial consideration. Mr. HAROLD NICOLSON reinforced Mr. Stokes's plea in a moving speech and Mr. EDMUND HARVEY pointed to the terrible increase of tuberculosis in Belgium. He quoted from a report of the American State Department that at least two-thirds of the young people of Belgium were suffering from tuberculosis. Mr. A. H. E. MOLSON urged that if once the principle were established for some particular favoured part of Europe that the rigour of the British blockade was to be departed from, then the whole logic and consistency of our position would have been abandoned. He hoped that the Government would stick firmly to their guns. Mr. W. J. BROWN urged the Minister not to be bound within the narrow limits of a departmental policy which makes half Europe ashamed of us, and half of us ashamed of ourselves.

Mr. DINGLE FOOT, parliamentary secretary to the Ministry of Economic Warfare, said no-one denied that there were great hardships in the occupied countries. It was true that in the urban districts there were shortages, particularly of meat and of fats. But the impression which was so sedulously created that practically the whole of occupied Europe was in a condition of famine at this moment was misleading. As a general rule it did not suit the Germans to create starvation in countries which they had to garrison, and from which they wanted production and labour. The weekly rations of the normal consumer in Belgium included 62 oz. bread, 5 oz. meat and over 100 oz. of potatoes. There were higher rations for other classes of consumers, and children under three and nursing and expectant mothers received 9 pints of milk a week. It was true that there were shortages for children of school age and the milk rations were not always available; but he claimed that these figures did not represent a starvation diet, and there was certainly no comparison between the standard they represented and the state of affairs whch prevailed in Greece when the present relief scheme was first instituted there. He could not see what useful purpose was being served by this constant presentation of a distorted picture. He did not think that anyone who studied the working of the Hoover relief scheme in the last war could doubt that it was of the greatest assistance to the Germans. If it was the German policy to impose malnutrition in nearly every occupied country, was it inconceivable that the German Government would allow supplies of food to pass through the blockade and reach those people? Although we had made an exception for relief to Greece no-one should believe that the enemy derived no advantage from the scheme. If we relaxed the blockade we were bound to bring some degree of benefit, direct or indirect, to the enemy. It must be remembered that although the German food situation was a good deal worse than ours, it was still better than it was in 1918. If we let in, in substantial quantities, all relief foodstuffs to German-occupied Europe at this time it would be a form of lend-lease to the enemy. If we made some token shipments to particular areas and relaxed the blockade where people were particularly necessitous or hungry we would be providing the enemy with a direct and powerful inducement to create extensive shortage over much wider areas. We knew that he would not hesitate to do so, and the Government did not propose to lay themselves open to this particular form of German blackmail.

QUESTION TIME

Rations of Repatriated Prisoners

Repatriated prisoners who are being treated in military hospitals and military convalescent depots are receiving the full scale of military rations. Those who have been transferred to EMS hospitals so that they may be as near as possible to their homes are at present receiving the civilian scale of rations. There are difficulties in differentiating between civilian and service patients undergoing treatment in the same hospital and perhaps in the same ward, but I am looking into this now. (Sir JAMES GRIGG replying to Lieut.-Commander R. L. TUFNELL.)

Exchange of Epidemiological Information

Replying to a question Mr. E. BROWN stated: Arrangements for the exchange of epidemiological information are in operation between this country, the Dominions and Colonies, the United States of America, and allied and neutral countries. The International Sanitary Conventions governing quarantine and other precautions are still being observed by all these countries, and their working has been adapted to war-time conditions and advances in preventive medicine. As regards

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the risks of epidemics in liberated countries and in the immediate postwar period I understand that this is among the matters which will receive closest attention from the United Nations Relief and Rehabilitation Administration.

Bovine Tubercle

Mr. A. EDWARDS asked the Minister whether any death certificates were received in which the cause of death was given as from bovine tuberculosis.—Mr. BROWN replied: Bovine tuberculosis can only be distinguished with certainty from other forms by laboratory procedure and in future medical practitioners certifying deaths from this disease in which such tests have been carried out will be asked to indicate this fact. So far as is known no such distinction has been made in any certification.

Tuberculosis among Sanatorium Nurses

Mr. F. MESSER asked the Minister if any machinery had been erected to obtain statistics showing the incidence of tuberculosis among the nursing staffs of tuberculosis sanatoriums separate from those in general hospitals in England and Wales; and, if so, whether figures would be given showing the death and case rate.—Mr. BROWN replied: No such machinery has yet been established but I share the desire to obtain reliable statistical information on this point. I am consulting my medical advisory committee and my standing advisory committee on tuberculosis as to the scope and form of the inquiries which ought to be made to attain the object.

Salaries of Male Nurses

Mr. BROWN informed Mr. MESSER that he had received within the last few days the second report of the Nurses Salaries Committee, which deals, among other things, with the salaries of male nurses employed in hospitals other than mental hospitals and in public-assistance institutions. It would be published as soon as possible.

Export of Proprietary Medicines

Major H. A. PROCTER asked the President of the Board of Trade whether any further relaxation had been effected during the last three months with regard to restriction on the export of British branded goods; and whether, in view of the unfortunate consequences which result from the loss of goodwill for such goods in overseas markets, he would take steps to seek further facilities for export at the earliest opportunity.—Mr. H. JOHNSTONE replied: Since my reply on May 25 arrangements have been made under which reasonable quantities of these goods may be exported to the Middle East through the normal channels of trade. The traders concerned have been told.

Leprosy in the African Colonies

Replying to a question Colonel O. STANLEY stated that apart from monies from native administration funds, the sum of £26,027 is provided in the current estimates of the African Colonies for direct expenditure on the treatment of leprosy or as subsidies to bodies engaged on that treatment.

Opium Smoking

HM Government in the United Kingdom have decided to adopt the policy of total prohibition of opium smoking in the British and British protected territories in the Far East which are now in enemy occupation and, in accordance with this policy, the prepared opium monopolies formerly in operation in these territories will not be re-established on their re-occupation. The success of the enforcement of prohibition will depend on the steps taken to limit and control the production of opium in other countries. HM Government will consult with the Governments of other countries concerned with a view to securing their effective coöperation in the solution of this problem.

POOL BATHS.—In a lecture on osteo-arthritis given to the Royal Institute of Public Health and Hygiene on Nov. 10, Dr. M. B. Ray referred to the value of the pool bath in treating this condition. A hot or warm pool, he said, should find a place in every public bathing establishment and one should be available in all centres of population. Yet so far as he knew there was only one in London. This form of treatment was extensively used in the United States and replies to a questionnaire addressed to 100 prominent institutions indicated that two-thirds had had therapeutic pools for on an average five years.

Letters to the Editor

THE TEACHING OF MEDICINE

SIR,—There is a danger that the reports published by the Royal College of Physicians upon social and preventive medicine and upon undergraduate education in psychiatry may tempt some to try to put a quart into a pint pot, and to organise still further what little remains of the students' free time. Lord Moran's recent letter to the *Times* does not, perhaps, entirely remove this risk. Although it may be true that the student need not necessarily burden himself with further new facts it is clearly the intention to provide him with new courses. The leit-motif of both sets of recommendations is, "there should be a course . . ."—another course. Now, no-one will deny that more emphasis needs to be put upon the clinical teaching of these subjects, but is it wise to suggest additional new courses without re-casting the curriculum as a whole? The limiting factor in undergraduate medical education is surely *time* as well as the amount which a student has to remember. Moreover, even now the medical man is one of the hardest worked and one of the least generally educated of students. Thinking can only be practised during leisure and with the help of informal discussion. It seems, therefore, that any way out of this modern doctor's dilemma should be through the consideration of the following:—

1. A review of the present curriculum, with ruthless pruning of the dead wood.
2. An increase in the efficiency of teaching methods.

The Services have something to teach us in regard to the second of these points, for they are faced with the same basic problem—i.e., teaching a man a complicated job in a limited time. May I therefore, Sir, suggest that "there should be a course" for teachers of medicine in which they should—

1. Study the methods of instruction used by the Service training organisations with especial reference to "synthetic" training.
2. Consider the making and use of instructional films by the medical units of the future as a definite branch of research.
3. Study the gentle art of "putting it across" as demonstrated by the various types of advertising and propaganda.

We are a professionally proud body, and probably rightly so; but it may be that in this matter the children of this world are wiser than the children of light, and that something can be learned from the other man.

R. C. BROWNE.

THE TONSILS AND ANTIBODIES

SIR,—The authority of your columns must be welcome to those who believe that too many tonsils are still taken out. But certain terms need amendment to secure proper action. "Enlarged" and "obviously," with "chronic tonsillitis," should be expunged from our terminology.

"Enlarged" infers comparison with a normal. No-one ever has described the size of a normal tonsil, and no-one ever will. To do so he must take into account the size of the subject, his age, the shape of the pharynx, the amount of lymphoid tissue there and in the body generally, the hygiene and ventilation of the home, personal and domestic cleanliness, room space, accommodation, nutrition and clothing, as well as exposure to droplet infection and tendency to infection. The attempt would be an impossibility. The term used to be applied to those vast masses that once obstructed respiration and that have passed away. Then, in what other part of the body does anyone remove an organ on the diagnosis of "diseased" without trying to define the pathological condition? "Obvious" is a danger to the clinician; it makes him feel that there is within him some God-given power of divination, instead of reminding him that he must settle down to consider every factor.

The problem is to assess the reactions of a single mass of lymphoid tissue to the hygiene of the subject having regard to the other masses of lymphoid tissue near the site and in the rest of the system. It resolves itself in

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any given case into trying to decide whether the organisms within the tonsil are neutral to the host or whether they are living in the crypts in a state of true or false symbiosis; for it is only in the last case that tonsillectomy is effective. "Pretonsillectomy throat cultures" merely pick up organisms which are on their way to be destroyed in the tonsil while being conveyed there by the ciliary action of the nose.

To say that unnecessary tonsillectomy is "common particularly among well-to-do families" suggests that medical men allow their judgment to be swayed either by the wish of the layman or by the desire for gain. Attempts are certainly made by parents to urge a doctor to advise this operation; and in border-line cases—and there are many—weight should be given to this wish. In a case where the balance of evidence is against operation the advice to wait six months will usually be taken. Sometimes they go to someone else, be they rich or be they poor. That the financial factor is not the cause is shown by the fact that the greatest excess is among those children who are dealt with under the Children Acts of 1906 and 1918.

Some medical officers of health strive to control the habit of tonsillectomy among their staffs. The question arises how much the administrator may use his power to guide the clinician, but it should be possible to draw up administrative instructions which would have the effect of eliminating unnecessary operations without interfering with the judgment of the true clinician.

I would like, in this context, to pay tribute to one who cannot speak for himself since he is in the hands of the Japanese—Prof. K. H. Digby of Hong-Kong. In 1919, when many were saying that the tonsils were a useless relic devoid of function, he put forward on anatomical and clinical grounds the view that not only were they filters to the entry of organisms into the body, but also that they had a definite function in raising the acquired resistance by the production of antibodies (*Immunity in Health*, London. See also *Lancet*, 1923, ii, 1077).

Guy's Hospital, S.E.1. T. B. LAYTON.

CLAVICULAR SHEAR

SIR,—To those who studied applied anatomy years ago it is interesting to see the mechanism of "clavicular shear" coming into its own again. The effect of this mechanism on the subclavian vessels, convincingly demonstrated in your issue of Oct. 30 by Major M. A. Falconer and Captain G. Weddell will recall to some of us its agency in producing Duchenne and Erb's paralysis of the brachial plexus and also the varieties known as anæsthetic paralysis, climber's paralysis, as well as several others. The active muscular agent which produces the shearing effect is not the scalenus anterior but the clavicular portion of the trapezius, the function of this being to carry the outer portion of the clavicle directly backwards across the first rib and so maintain apposition of the scapula to the thoracic wall when the arm is abducted. The shearing stress is exerted between the clavicle and the first rib. The forward curve of the inner part of the clavicle is a safeguard in this movement. The muscular mechanism of the shoulder is, usually, not sufficient to produce a harmful shear, but force must be applied to the abducted, and usually raised arm. Hence the birth lesion in the infant occurs when the arm is extended above the head, the climber's paralysis when the weight of the body hangs on the arm in hand-over-hand climbing, and the nursemaid-induced paralysis when a child is grasped and suspended by the wrist in removal from a perambulator or in crossing a road.

Hanley House, N.W.1. CHARLES R. BOX.

RISING HÆMOGLOBIN IN EIRE

SIR,—The hæmoglobin content of the blood of patients of this hospital has seemed to show a definite increase during the past year or more. The only explanation which has occurred to me is that the government of Eire has made the use of 100% extraction wheaten flour compulsory in all bread manufactured. I understand that another large hospital in this city has noticed a similar rise in the hæmoglobin level of its patients. I must leave it to others more qualified than myself to work out how far this bears on the work of McCance and his collaborators on phytic acid and iron absorption, reported in the *Lancet* of July 31. The value of the extra vitamin B in our 100% extraction flour has also been noticed, so that I think the whole subject of the scientifically best percentage of extraction of wheaten flour requires very expert handling.

Royal City of Dublin Hospital. E. HARVEY.

FEEDING WITH AMINO-ACIDS

SIR,—May I comment on your leader of June 12? I think the term "animo-acids" is one which should be avoided, and "casein hydrolysate," which is more accurate and more informative, should be used instead. Very few investigators have used amino-acids clinically, and the preparations which are used for therapeutic purposes contain only about 60% of their nitrogen in amino form. The other products of protein disintegration and the residues of the pancreas which furnished the enzymes are also present. In any event, "amino-acid hydrolysates" is incorrect.

It is stated: "It is hard to see why a solution of mixed amino-acids prepared from casein should be any better for a man than a good glass of milk. It is hard to see, therefore, why they should ever be given by mouth." I consider this a very careless statement. Milk contains other factors than protein. Our published work has shown that infants with acute gastro-intestinal disturbances tolerate casein hydrolysate and carbohydrate mixtures better than milk. In addition, infants allergic to milk can take casein hydrolysate orally to good advantage. Further, it should be obvious that in cases in which the enzymes for the splitting of protein are lacking it might be both good physiology and good therapeutics to feed a preparation which was not beyond the digestive capacity of the patient.

At the end of the second paragraph it is indicated that some of the work has been poorly done with inadequate controls, and it is implied that the conclusions reached may have been arrived at because of prejudiced financial interest. I think it unfair thus to make a general condemnation either of the quality of the work or of the scientific honesty of the investigators cited. Such words as "skilful advertising" and "fashionable" cast a slur on the scientific validity of this work and imply that it is a matter merely of commercial exploitation. I am entirely sympathetic to this attitude with regard to commercial advertising, especially to many vitamin preparations. However, I think one should differentiate sharply between scientific papers and the commercial developments following them.

I have the conviction that the lives of many British and American soldiers may be saved by the administration of casein hydrolysate, and I hope that your article will not create a prejudice against its use in Great Britain.

Harvard Medical School, Department of Pediatrics, Boston. ALFRED T. SHOHL.

THE GOVERNMENT AND THE PROFESSION

SIR,—We wish to add our names to those of the 238 members of the BMA and of the group of Sheffield doctors who wrote in your issue of Oct. 30 deploring the action of the BMA in advocating an extension of the panel system in place of a comprehensive national service. We agree that the Government will find no difficulty in obtaining the necessary support in the profession for a really progressive plan based on a salaried service organised by grouped local health authorities, and consider that this is the only satisfactory method of implementing this essential part of a social security act.

C. C. CONNOCHIE (Fort William).
A. M. FRASER (Inverness).
G. A. JAMIESON (Inverness)
A. LAMONT (Uig, Skye).
D. G. LEYS (Inverness).
A. MACDONALD (Carbost, Skye).
I. H. MACIVER (Fort William).
J. T. MACKENZIE (Edinbane, Skye).
M. MACLEAN (Duirinish, Skye).
E. M. ROSE (Inverness).
ALICIA SYMONDSON (Inverness).

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THERAPEUTIC USES OF THORIUM X

SIR,—In his interesting article in your issue of Sept. 18 Mr. Corsi demonstrates the therapeutic value of thorium X in dermatology. In an investigation with various collaborators beginning in 1909 regarding the physical, chemical and biological effects of thorium X, we found it a most suitable material for investigation of radio-activity in general. What we found was valid not only for thorium X but for all radio-active substances and sources (radium, thorium and its derivatives, X rays, &c.). As the application of thorium X involves certain dangers it is essential to be fully informed about the effects and properties of such an intricate material. May I therefore complete Mr. Corsi's references, which only go back as far as 1923, by referring to our researches published in the *Zeitschrift für Experimentelle Pathologie und Therapie* in 1912.

North Row, W.1. J. PLESCH.

MOULD AS A HOME REMEDY

SIR,—I have received the following note from Mr. H. L. Watkinson, headmaster of Mexborough Grammar School, Yorkshire.

"During my undergraduate days at Cambridge, within the period 1911–13, I called at the Botany Laboratory to do a little extra work. We were studying fungi and the activities of the class were centred at that time on *Penicillium glaucum*. It was the custom in the class to be provided with a growth of the fungus which had been previously grown on old pieces of shoe leather. Only a portion of the growth was used and on the occasion of my calling the old laboratory attendant was collecting the stuff left on the students' benches. I was somewhat curious and asked why he was so carefully scraping off the fungus into a jar. He told me that he used it for a salve which had been used in his family for a very long time. It was used for what he called gatherings. I presume by this he meant septic wounds."

Perhaps we have not yet made a serious enough attempt to investigate such home remedies.

Wakefield. B. R. TOWNEND.

"... We take rigorous action over plague; we should take equally rigorous action over phthisis, because every positive-sputum case is a direct threat to every adult, and especially to every child, with whom he comes into contact. Further, direct loss to national economy through this disease is incalculable. Every sufferer whose illness renders him unfit for work not only ceases to contribute to the general economy, but also must be maintained by it, so that before his return to work or his death from the disease he costs anything from £200 to £1000, most of which outlay unfortunately is of no avail in the vast majority of those cases diagnosed by the only methods open to us up to now. Moreover, pulmonary tuberculosis claims half the total deaths from natural causes between the ages of 15 and 24, which age-group is of paramount importance to our national economy.

"Only those who do not understand the factors underlying our past failures blame the general practitioner and the tuberculosis services. No-one can examine the non-existent patient. For diagnosis, doctor and patient must meet. Up to now in civil practice the doctor has had to wait until the patient comes to him, driven by symptoms.

"We have in mass radiography a method to hand of sifting from the normal those 1% of examinees who will show evidence of a pulmonary lesion. Some 50% of these will have disease of limited extent, as against the 15% among those diagnosed after the appearance of symptoms. Only some 10%, as against 40%, will be in the advanced stage of the disease. Looked at from the most sordid aspect of pounds, shillings and pence, there is no doubt whatever that we can more than offset the original cost of a new chest radiography unit by the first ten patients on whom we can make a definite diagnosis."—Wing-Commander R. R. TRAIL addressing the Royal Institute of Public Health and Hygiene on Oct. 20.

ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS.—On Oct. 16 the following office-bearers were appointed: chairman, Dr. J. C. Bridge; secretary, Dr. William Blood; treasurer, Dr. S. A. Underwood; members of the executive committee, Dr. Alice Swanston, Dr. Donald Stewart, Dr. W. E. Chiesman, Dr. R. S. F. Schilling and Dr. D. C. Norris.

Obituary

KENNETH CHRISTIE EDEN

M S LOND, F R C S; MAJOR RAMC

BY the death of Kenneth Eden from poliomyelitis the Army loses an outstanding war surgeon. A pupil of Wilfred Trotter, he was known to be industrious and able. But his recent success in command of a neurosurgical unit went far beyond expectation. Indeed, his work in the Mareth-Tunis campaign set a new standard for the treatment of head wounds of war.

From University College Eden went to University College Hospital in 1932, and he qualified two years later. After holding house appointments he went abroad with a travelling scholarship. On his return to UCH he was Harker Smith registrar, working on cancer and radium, and then assistant in the surgical unit; he also held the John Marshall fellowship in surgical pathology. At the outbreak of war he joined an EMS neurosurgical unit, but in 1941 he was back at UCH as surgical registrar. During these few years he wrote useful papers on cervical rib, fibro-osseous tumours of the skull, and dumb-bell tumours of the spine (a Hunterian lecture), and with W. R. Trotter he described observations in the thyroid clinic at UCH. Though he early showed a leaning towards neurosurgery, he was interested in many other topics. His ability was above the average, but he won the esteem of his seniors (one of them tells us) not so much for brilliance as for sheer hard work and devotion to his job. To those who did not know him well these qualities were not apparent, for there was no bustle about him and he often had an air of charming indolence. He had many friends.

H. C. writes: Eden's unit went with the Eighth Army from El Alamein to Tunis. Earlier experiences had suggested that in this war battle casualties could not be segregated in the forward area, and it was therefore held that neurosurgical units should work further back, at general hospitals on the lines of communication or at the base. In the battles of Tripolitania air evacuation proved slow and uncertain, and so Eden decided to split his unit into a mobile operating team to be stationed at the most forward operating centre, and an advance base team which remained in Tripoli. He secured a derelict Italian motor-coach and had it fitted out as a mobile operating-theatre, and he himself worked in this for the rest of the campaign, usually with the most forward casualty-clearing station. By this means he was able to excise and close the majority of the head wounds of the Eighth Army within 24 hours, and to obtain over 90% of primary healing, a great improvement on anything previously seen in this war, for on all fronts up to date the incidence of abscess after brain wounds has been high. The conditions from Mareth to Tunis were, to be sure, unusually favourable for segregation in the forward area, but Eden could have made nothing of the opportunity unless he had fully equipped and prepared himself for it. Those who worked with him in battles say that his capacity for operating continuously without sleep was exceptional. Beneath his quiet, rather languid manner there was great fire, and he proved himself a fine leader both as a unit commander and a surgeon.

Major Eden's observations in the final North African campaign will shortly be published in these columns.

ALEXANDER PIRIE WATSON

OBE, CH M EDIN, F R C S E

Mr. Pirie Watson, surgeon to the Edinburgh Royal Infirmary and consulting surgeon to the Leith Hospital, died at his home on Oct. 22 after an illness of several months.

Soon after graduating in medicine in 1908 at the University of Edinburgh Pirie Watson became assistant to Alexis Thomson, who then held the chair of systematic surgery. He thus learned the art of surgery from a master of its technique and its science. On the suggestion of his tutor J. W. Dowden, Pirie Watson began an intensive study of fractures and for his ChM thesis on this subject he was in 1911 awarded the Syme surgical fellowship and the Chiene medal. In the same year he became a fellow of the Royal College of Surgeons of

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Edinburgh, and only a few days before his death he was re-elected to their council. Pirie Watson had been a schoolmaster before he became a surgeon; he remained a stimulating teacher and both he and his students enjoyed his lectures on clinical surgery at the university and on systematic and operative surgery at Surgeons Hall. He was appointed to the staff of the infirmary in 1919 and in the demanding and difficult task of hospital service he found a deep satisfaction. Since the outbreak of war Pirie Watson had also acted as an EMS surgeon at the Astley Ainslie Institution. In the previous war he saw active service in Gallipoli, on the Suez Canal and in the Syrian campaign. For his work in these years he was mentioned twice in dispatches and awarded the OBE. Always an enthusiastic territorial, from 1933 to 1937 he held the appointment of ADMS to the 52nd (Lowland) Division with the rank of colonel.

J. F. writes: "Pirie Watson's apprenticeship in the teaching profession was sound, for it gave him a mental culture and sense of judgment which later characterised all he said or did. Sometimes it seemed as though his early training led to an attitude of undue deliberation, but this was also evidence of what was with him an instinct—the anxiety to act honestly and correctly. An offshoot of his military interests was his love of bagpipe music and Highland dancing. He was a good piper, and he stimulated others to follow his example. To see and to hear the pipe-band of the Second Scottish Hospital on parade was to appreciate the measure of his success. It was in the Highland reel, however, that one saw him at his best. It was his favourite dance, and to hear his inimitable 'Hooch!' was to realise something of the joy and thrill which it gave him. He was a good fellow, and now that he has gone from among us we cherish happy memories of his steadfastness and loyalty, his quiet humour and his gift of friendship."

JOHN HOWARD HORNE

M B EDIN; MAJOR IMS RETD.

ON the death of Major Horne on Oct. 31 one of his friends writes: That heroism may be shown as clearly in the sickroom as on the battlefield was obvious to all the friends of Jack Horne—Jacko, to his intimates—who has died after more than twenty years of suffering and invalidism. Born in 1884, the son of John Horne, FRS, the most prominent Scottish geologist of his time, Jack appeared to inherit that nobility of mind and tenacity of purpose which had led his father to so eminent a position in science. He was educated at George Watson's College and at Edinburgh University, and on graduating in 1907 he was awarded the McCosh travelling scholarship, under the terms of which he studied for a year in Hamburg, Berlin, and Paris, engaging in bacteriological research with characteristic zest. On returning he entered the Indian Medical Service, then the blue ribbon of public medical services, taking a high place and specialising in bacteriology. He did excellent work in India, where he was highly respected by Indian and European alike. Within ten years of commencing his life-work, however, he began to show symptoms of rheumatoid arthritis which, despite treatment, grew steadily worse and which ultimately caused his death. Of his desperate struggle against heavy odds for over twenty years, his complete helplessness during most of that time, and his blindness during the last two years, he would not wish one to speak. He himself never referred to his illness, though the trial would have broken most men. However frail his body might be, his brain was alert to the last. His keen interest in Nature; in the birds and flowers of Strathpeffer, where he had made his home; in the effects of light and shade on the hills which intrigued him as long as his sight remained; in books, especially history and biography, which his devoted nurse read to him daily; in the careers of his colleagues which he followed with interest; in the rapid advances of bacteriology and allied sciences—these were only a few of the multiple activities of this brave man, who was determined to continue the fight at all costs. A month before his passing, conversing cheerfully with me, he recalled a day many years before, when we had roamed the Galloway hills together in the tracks of Crockett's *Raiders*, and he insisted on confirming the exact wording of the description of Sloth in *The Pilgrim's Progress*, which he jokingly applied to himself. The talk turned to his friend Colonel George Macpherson, IMS, who had just died at Montreux, and Jack described him as "a man of wide interest and a true friend too; unsparing of himself and eager to help others." What more fitting epitaph could be applied to Jack Horne than those words of his own, for his influence during his long illness extended far beyond the invalid chair from which he looked out, with sightless eyes, yet with clear inward vision. D. G.

WILLIAM HAROLD GRAHAM ASPLAND

M D TORONTO, F R C S E

NEWS has been received from the Swiss representative at Shanghai of the death of Dr. W. H. G. Aspland, physician to the British Embassy at Pekin, on June 13 after a seizure. Dr. Aspland was born at Toronto in 1868, took the English conjoint in 1896 and the following year the MD Toronto. He immediately offered his services to the Grenfell Mission in Labrador which had lately started a small hospital on Battle Harbour Island under the direction of Miss Ada Carwardine, a London Hospital nurse who had been recommended for the task by Sir Frederick Treves. The work of the hospital had grown so rapidly that the mission decided to send a doctor as well, and Aspland was chosen for the job. With Miss Carwardine, who later became his wife, he continued the work on the island and on the mainland for several years, with rare visits to England. Soon after the beginning of the century Dr. and Mrs. Aspland joined the Church of England Mission at Pekin where Dr. Aspland founded a hospital which he ran with Chinese assistants. He himself soon spoke the language so fluently that he was appointed a lecturer at the Rockefeller Institute and also had an interesting practice among high-class Chinese. He held the chair of obstetrics and gynæcology at Pekin University Union Medical College. When the epidemic of pneumonic plague broke out both the Asplands volunteered, but the authorities would not accept women, so Dr. Aspland set out to Manchuria alone where he served under a Chinese doctor.

When war broke out in 1914 Dr. and Mrs. Aspland were in this country on leave. As medical officer and matron they at once took charge of a hospital for the French Red Cross. Later while working in Serbia they were taken prisoners by the Austrians, brought to Vienna and eventually repatriated. But a few weeks of idleness were more than enough for Dr. Aspland and he soon joined the Anglo-Russian Hospital, then under the direction of Mr. Douglas Harmer. Aspland was first posted to the headquarters at Petrograd. Later with the field ambulance attached to the Imperial Guards he advanced with the Russian Army through the Pripet marshes. The next winter he returned to Petrograd where he remained until 1917 when he went to work for the Save the Children Fund in Armenia. After the war Dr. and Mrs. Aspland returned to Pekin where Dr. Aspland set up in private practice among the Chinese and Europeans. During the Japanese occupation Pekin is said to have remained quiet, and the Asplands seem to have been well treated. When Japan came into the war they were interned in their own house in the Embassy compound and, though food was scarce and dear, they were fairly comfortable. The message from the Swiss representative reports that Mrs. Aspland is well.

ANOTHER REFRESHER COURSE IN TUBERCULOSIS.—The Joint Tuberculosis Council and the National Association for the Prevention of Tuberculosis in collaboration with the London Medical and Panel Committee and the London Public Medical Service have organised a course in tuberculosis for general practitioners to be held on the afternoon of Thursday, Dec. 16, and all day Sunday, Dec. 19, at 11, Chandos Street, London, W.1. The following are to be the lecturers: Dr. Joseph Smart, modern methods of diagnosis; Dr. James Maxwell, home management; Mr. T. Holmes Sellors, collapse therapy; Dr. Peter Kerley, diagnosis by X rays; Dr. C. H. C. Toussaint, facilities offered by local authorities for prevention, diagnosis and treatment; Dr. W. P. H. Sheldon, tuberculosis in children; Dr. Andrew Morland, the peculiarities of tuberculosis. Further information from Dr. Harley Williams, Tavistock House North, W.C.1.

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Notes and News

ROLL OF CONSULTANTS

THE Royal College of Physicians of London and the Royal College of Surgeons of England have established a Central Medical Academic Council to survey consultant and specialist services in England and Wales and to compile a list of consultants. The colleges suggest that area committees shall be set up to nominate to the council practitioners for inclusion on the list. The colleges hope that a university which includes a medical school will form the centre of each area; the vice-chancellors of the various universities have already consented to act as chairmen of the committees. At a meeting of the congregation of the University of Oxford on Nov. 9 it was agreed that the board of the faculty of medicine should nominate as members of the area committee for Berks, Bucks and Oxon two consulting physicians, two consulting surgeons and one consulting gynæcologist who are practising in the area. The regius professor of medicine will be an ex-officio member of the committee.

ANNUAL PANEL CONFERENCE

THE agenda of the conference on Oct. 28 was a full one and it needed Dr. J. A. Brown's skilful chairmanship to get the business through in the day. Next year two days are to be taken. The offer on Oct. 21 by the Minister of Health and the Scottish Secretary of a war-time bonus to insurance practitioners earning less than £850 a year was held (with one dissentient) to be "most unsatisfactory" and the IAC was instructed to claim an increased capitation fee for all practitioners to cover their increased work and cost of living. The conference next expressed its sympathy with the conception of a comprehensive medical service but urged the Government not to introduce it until there were enough doctors to run it efficiently. Should NHI be extended to include dependants the conference insisted that the rôle of the approved societies should be limited to that of collecting and distributing agents. The conference reaffirmed its faith in the family doctor as the pivot of any future medical scheme; all would be well if he was provided with proper hospitals in which to examine and treat his patients himself or to keep in touch with the appropriate specialist. The Minister of Health was urged to take action on the Industrial Health Research Board's report on excessive hours in war-time industry. Finally the conference welcomed the Minister's concession, made the previous day, to pay a fee of 16*s.* 6*d.* for every man discharged from the Services on medical grounds. Dr. Brown was unanimously re-elected chairman.

HEALTH WORKERS COUNCIL ON NHI EXTENSION

AT a recent meeting this council of 18 affiliated organisations laid down certain general principles as a guide to the discussions on the Government's proposals. A modern health service, it was agreed, should be based on group practice, organised through health centres, should make all types of specialist advice readily available, should provide an adequate hospital service and should be available for the whole population, so that there is a single standard of medical care for all. The service must be preventive as well as curative, should provide for rehabilitation, and should be able to assess and take into account all social factors affecting health. No extension of NHI, it is said, can give us such a service, but would rather perpetuate the anomalies and anachronisms of the system, particularly the administration of social security funds by Approved Societies, practice from ill-equipped and ill-adapted premises, competition for patients, and in particular the isolation of the doctor from his fellows and from all other health workers. It would be impossible to organise the medical profession and its allies as a team, and extension of NHI would do nothing to inculcate the team spirit, which is essential to modern medicine.

SPECIALISED TRAINING FOR NURSES

AT a meeting on Oct. 21 the council of the Royal College of Nursing considered the need for further post-certificate courses for nurses, both in and outside London, and in Scotland. The Rushcliffe Committee has emphasised the importance of standardising the qualifications of sister-tutors, many of whom hold their position without any special training for it. In Scotland, indeed, there are only 12 qualified sister-tutors out of some 60 holding appointments. The development of a comprehensive health service will call for nurses with specialised training in many branches of their profession, and after the war relief abroad will absorb the services of large numbers of nurses. New training courses to be offered at the College have already made it necessary to take over additional premises in the building. A minimum 6-weeks course is being held for industrial nurses, under the Ministry of Labour scheme of grants; and a new 18-months course is being offered to nurse dietitians. Under some Government schemes nurses taking this dietetic course receive free tuition coupled with maintenance up to £300. Public bodies, such as the Nuffield Trust, and private firms and benefactors are helping to meet costs of special training. Under the terms of the Halford bequest the council was able to award twenty £50 bursaries to promising student nurses for post-certificate study in occupational therapy, industrial nursing, dietetics, midwifery, tuberculosis nursing and after-care, district nursing, nurse teachers courses, postwar relief.

The College is also arranging a conference of private nurses with a view to ascertaining the present demand for their services throughout the country. This may prove a first step in coördinating a branch of the profession hitherto very loosely organised.

WHERE CHRISTMAS LOOKS IT

IN Labrador sledges, husky dogs, fir trees laden with snow, skates, snow shoes, and Eskimo hoods are not merely to be found on cards round about Christmas time—they are there for all to see, and no doubt to enjoy (if you like that kind of thing). Those of us who prefer them in a picture can help the children of Labrador by buying, through the Grenfell Association, cards and calendars which will please our friends by their vitality. In some, dog teams are waiting harnessed to the sledge, in others polar bears and penguins make their staid appeal, and in a gay one a number of arctic animals, overcome by the Christmas spirit, dance beneath the Northern Lights. Life in Labrador is hard, and people are poor there. Those who wish to help the families of Labrador and Newfoundland men now serving with our Forces can do it agreeably by purchasing cards (1*s.* 6*d.* and 1*s.* 9*d.* a box of six) or calendars (3*d.* each) from Miss Spalding, Grenfell Association, 66, Victoria Street, London, S.W.1.

CLINICAL SOCIETY OF LONDON

IN a presidential address to the clinical section of the Royal Society of Medicine on Oct. 8, Dr. J. D. Rolleston said that the formation in 1868 of the Clinical Society of London, parent of the section, was mainly due to Dr. Headlam Greenhow and Dr. (afterwards Sir) John Burdon Sanderson. The most interesting event connected with the Clinical Society was the first medical description in this country of X rays which was made before it nearly 50 years ago; at a special meeting on March 30, 1896, nearly 400 members attended to hear Professor Silvanus Thompson talk on the new discovery. A remarkable custom in the society's practice was the frequent establishment of special committees to describe various subjects or individual cases; the most important of these committees were those on myxœdema, the periods of incubation and contagiousness of certain infectious diseases and the antitoxin of diphtheria soon after its introduction into this country. At the time of its amalgamation with 16 other societies in 1907 the Clinical Society had 572 ordinary and 17 honorary members.

Royal College of Surgeons of England

At a meeting of the council held on Nov. 11, with Sir Alfred Webb-Johnson, the president, in the chair, the Gilbert Blane medal was presented by Admiral Sir Sheldon Dudley to Surgeon Commander D. P. Gurd, RN.

The following were re-elected members of the court of examiners: Mr. V. Zachary Cope, Mr. C. E. Shattock, Mr. E. W. Riches, Mr. W. H. C. Romanis. Mr. J. Leigh Collis was elected a Hunterian professor for 1944.

Diplomas of membership were granted to the candidates named in the report of the comitia of the Royal College of Physicians in the *Lancet* of Nov. 6, p. 591, and to Dorothy Willoughby and D. E. R. Kelsey. Diplomas in public health were also granted jointly with the Royal College of Physicians to Phyllis M. Button, Kathleen Fost, Margaret E. Meyrick, H. A. Nathan, and Lucy M. Sutcliffe.

Royal College of Obstetricians and Gynæcologists

Regulation 3, relating to practitioners who have not fulfilled the requirements of regulation 2 for the DRCOG in respect of resident appointments, will be suspended after March 1, 1944, for the duration of the present emergency.

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Society of Apothecaries of London

Sir Stanley Woodwark, the master, presided at a court of the society on Oct. 26, when Dr. H. S. Morley took his seat on the court of assistants. Dr. J. P. Hedley was reappointed representative on the General Medical Council.

J. L. Hopkins was promoted to the livery, and the following were elected to the freedom of the society: R. C. Evans; A. J. M. Reese, licentiate; J. L. Hamilton, licentiate; T. C. Bradshaw; and A. H. Torrance.

The diploma of the society was granted to G. R. S. Jackson, J. M. Macdonald, J. C. F. Poole, A. M. Rajah, N. Sachse, J. H. S. Scarlett, M. N. Tata, R. N. Theakston, W. M. Thomas and J. K. Wilson.

Royal Faculty of Physicians and Surgeons of Glasgow

At a recent meeting of the faculty the following were elected office-bearers for the ensuing year: president, Mr. James MacDonald; visitor, Mr. William Sewell; treasurer, Mr. William Richard; librarian, Dr. W. R. Snodgrass; representative on the General Medical Council, Mr. Andrew Allison; other councillors, Mr. J. Scouler Buchanan, Dr. Geoffrey Fleming, Dr. John Gardner, Dr. Stanley Graham, Dr. Donald McIntyre, Dr. Noah Morris, Mr. G. T. Mowat, Dr. J. Forbes Webster, and Mr. Roy Young.

Course for the DPM

The usual course of lectures and practical instruction for the diploma in psychological medicine will be held in January, 1944, at the Maudsley Hospital, Denmark Hill, London, S.E.5, if a sufficient number enrol before Nov. 30. Clinical instruction in psychiatry and neurology will be arranged if required. Further information from Dr. W. W. Kay, acting director of the Maudsley Hospital medical school, at West Park Hospital, Epsom, Surrey.

London MB, BS Examination

Supplement (3) to the official blue-book (whose issue is in abeyance) confirms the holding of an additional MB, BS exam in February (entries by Dec. 17). Among recognised institutions the words "(for first three years only)" have been deleted after "Oxford: the University Medical School with the Radcliffe Infirmary." In the list of LCC mental hospitals at which the course on mental diseases may be taken, The Manor, Epsom, has been deleted, St. Ebba's and West Park, Epsom, added.

Royal Society of Medicine

At 4.30 PM on Monday, Nov. 22, Major Roger McMahon, CADC, is to read a paper to the section of odontology on exodontia technique. On Nov. 23, at 4.30 PM, at the section of medicine, Lord Horder will introduce a discussion on the state of nutrition in enemy-occupied Europe. The openers are to be Colonel W. E. Vignal and Dr. A. P. Cawadias. Prof. James Young and Dr. Izod Bennott will also speak. On Nov. 25, at 5 PM, the urology section will hold a clinico-pathological meeting. On Nov. 26, at 3 PM, at the section of epidemiology and state medicine, Dr. A. A. Lisney and Major E. T. C. Spooner will open a discussion on epidemic hepatitis: recent field investigation.

Wellcome Veterinary Research Station

The Wellcome Foundation has acquired the Ely Grange estate at Frant, Sussex, for use as a veterinary research station. Mr. R. F. Montgomerie, PH D, FRCVS, veterinary research director at the Wellcome Physiological Research Laboratories, Beckenham, has been appointed director of the new station, and Mr. S. L. Hignett, MRCVS, is to be resident veterinary surgeon. The mansion is at present requisitioned by the Government, but as soon as it is vacated it will be converted into laboratories.

Health Gospellers

Medical men and women are urgently needed by the Central Council for Health Education to give occasional lectures during their spare time. They should have a flair for giving technical instruction in simple language, and in such a way as to arrest and hold the interest and attention of lay audiences. An honorarium of £1 1*s.* is paid per lecture, and an allowance for travelling and out-of-pocket expenses. Further information may be had from Dr. Robert Sutherland, medical adviser to the council, Tavistock House, London, W.C.1.

THE annual consumption of liquid paraffin at Guy's Hospital has now fallen from the prewar 2000–3000 gallons to less than 200 (*Guy's Hosp. Gaz.* Nov. 13, 1943, p. 250).

Association of Anæsthetists of Great Britain and Ireland

On Oct. 28 the following officers were elected for the ensuing year: president, Brigadier Ashley Daly; vice-president, Dr. C. Langton Hewer; treasurer, Dr. Z. Mennell; and secretary, Dr. A. D. Marston.

Medical Honours

The Military Cross has been awarded to Captain Isaac Joseph, MB WALES, RAMC, and to the late Captain Leopold Herbert, MD BELF., RAMC.

Infectious Disease in England and Wales

WEEK ENDED NOV. 6

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 3374; whooping-cough, 1755; diphtheria, 770; paratyphoid, 4; typhoid, 4; measles (excluding rubella), 553; pneumonia (primary or influenzal), 676; puerperal pyrexia, 142; cerebrospinal fever, 44; poliomyelitis, 11; polio-encephalitis, 0; encephalitis lethargica, 4; dysentery, 146; ophthalmia neonatorum, 85. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Nov. 3 was 1892. During the previous week the following cases were admitted: scarlet fever, 191; diphtheria, 45; measles, 15; whooping-cough, 42.

Deaths.—In 126 great towns there were no deaths from enteric fevers, 1 (0) from scarlet fever, 7 (0) from whooping-cough, 12 (1) from diphtheria, 44 (10) from diarrhœa and enteritis under two years, and 31 (4) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 189 (corresponding to a rate of 32 per thousand total births), including 22 in London.

Appointments

HARPUR, H. P., MD DUBL.: examining factory surgeon for Kidsgrove, Staffs.

LAIRD, ROBERT, CH M GLASG., FRCSE: non-resident surgeon for Clare Hall Sanatorium, South Mimms, Middlesex.

WILSON, W. J. S., MD.: MO, Jamaica.

Births, Marriages and Deaths

BIRTHS

ABRAHAM.—On Nov. 5, at Harpenden, Herts, the wife of Surgeon Lieut.-Commander J. C. G. Abraham, RNVR—a daughter.

BARNES.—On Nov. 10, at St. Albans, to Dr. Augusta Barnes (*née* Inglis), wife of Mr. J. G. Barnes—a son.

BOLTON.—On Nov. 10, at Durban, the wife of Major Reginald Bolton, RAMC—a son.

CADMAN.—On Nov. 7, in London, the wife of Dr. Donald Cadman—a daughter.

COOMBS.—On Nov. 10, at Bristol, the wife of Dr. C. J. F. Coombs, Perranarworthal, Cornwall—a daughter.

HUNTER.—On Oct. 29, at Stockton-on-Tees, the wife of Dr. Norman Hunter—a daughter.

MCMICHAEL.—On Nov. 8, in London, the wife of Dr. John McMichael, —a son.

MOLLISON.—On Nov. 1, at Carshalton, the wife of Lieutenant P. L. Mollison, RAMC—a son.

PINNIGER.—On Nov. 8, at Woking, the wife of Dr. John Pinniger—a daughter.

ROSS.—On Nov. 5, at Welwyn Garden City, Herts, the wife of Dr. James Ross—a son.

SILVER.—On Nov. 1, at Edinburgh, the wife of Dr. A. Stuart Silver —a son.

TOLHURST.—On Nov. 6, at Gravesend, the wife of Surgeon Lieutenant Denis Tolhurst, RNVR—a daughter.

WARREN.—On Nov. 12, in London, to Josephine Barnes, FRCS, wife of Captain H. B. S. Warren, RAMC—a daughter.

MARRIAGES

KENNEDY—INNES.—On Nov. 6, at Plymouth, Hugh Henry Kennedy, surgeon lieutenant RNVR, to Frances Joan Innes.

RILEY—MARTIN.—On Nov. 10, at Selkirk, Paul Brook Riley, captain RAMC, to Esther Georgina Martin.

SOUTAR—DARLING.—On Nov. 12, in Edinburgh, Stanley Ferguson Soutar, FRCSE, to Margaret Elizabeth Darling, MB.

YOUNG—LOCKSTONE.—On Oct. 29, at Freshwater, IOW, John Young, surgeon lieutenant RNVR, to Gwendoline Marjorie Lockstone, WRNS.

DEATHS

ANDERSON.—On Nov. 15, at Brighton, Louisa Garrett Anderson, CBE, MD LOND.

CALLANAN.—On Nov. 7, at Dymchurch, Kent, Christopher Joseph Callanan, MB NUI, formerly of Cork, Eire.

OWSLEY.—On Nov. 11, George Chetwode Owsley, MB LOND, of Montpelier Row, London, S.E.3, aged 69.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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AN EXCURSUS ON THE TERMINOLOGY OF STATISTICAL EXPERIMENTATION *

SIR ALMROTH WRIGHT, M D DUBL, F R C P, F R S
PROFESSOR OF EXPERIMENTAL PATHOLOGY IN THE UNIVERSITY OF LONDON

The first thing to be done if entrusted with the Government of the State would be to rectify names.—Saying of Confucius.

LET me, before I deal with the main issues which specially concern us here, say something about terminology in general, and in particular about terminology of statistical experimentation. As a first general point I would have the reader note that we may, when we find ourselves provided with a full scientific terminology, feel sure that we are dealing with a science which has attracted to its service generations of men of eminently intellectual ability. Full vocabularies of that kind are those of grammar, formal logic, mathematics, Roman and English law; also those of chemistry, botany, anatomy, physiology and medicine. When, on the other hand, we have (like an aphasic patient, or the ordinary man endeavouring to express himself in a foreign tongue) to struggle with a terminology in which there are things which we would wish to express, but we cannot find words for, it is safe to assume that we are dealing with a science which has attracted to its service only men of mediocre ability. And let me say, incidentally, that what applies to terminologies applies in a measure also to languages. Languages which have a poor vocabulary are languages of ungifted, and those which have a rich vocabulary are languages of gifted people.

LACUNÆ IN THE VOCABULARY

The vocabulary of statistical experimentation is, as the reader who has any acquaintance with it does not require to be told, distressingly defective. Allow me to draw your attention to some of the notable lacunæ in its vocabulary—lacunæ which cannot have failed to arrest the attention of all who have occupied themselves with that vocabulary. Fault can be found with it first on the ground that it, though it provides the name "controls" for those members of a class not experimented upon, fails to provide any generic name for those experimented upon. These, when they have been experimented upon with vaccine, have to be denoted "the vaccinated" or "the inoculated." And when they have been experimented upon with a particular diet, they have to be called "the dieted." And when they have been experimented upon with a drug, they have to be called (the term is distressingly non-eiconogenetic) "the treated."

The reader will appreciate that a terminology of this sort—I mean a terminology which supplies *specific* but no *generic* names—has definitely barbaric affinities. I take the following from Jespersen[1]:—

"The aborigines of Tasmania had a name for each variety of gum-tree or wattle-tree, but they had no word for *tree*; . . . And the Zulus have words for a 'red cow,' a 'white cow,' and a 'brown cow,' but none for a 'cow in general.'"

It will, in view of the labour of expressing oneself with a terminology in which general ideas cannot be expressed, here be desirable to provide generic names for "those experimented upon" and "those not experimented upon." We might perhaps call the former "the observed" and the latter "the counter-observed"; or we might when lists are made of the observed and counter-observed call the former "the inscripts" and the latter "the contra-scripts."

Another serious lacuna comes into view when we regard the fact that there is not, as the terminology of statistical experimentation might lead us to suppose, only one kind of "control," There are definitely two sorts of controls. There is to begin with the "se-ipsic" or "autoproteric" control—that in which we compare the condition of a patient after treatment to his condition before. And there are also other controls—I propose to call them the "allotrious isochronous controls"—where we compare a group of inscripts with a group of contrascripts. It will be appreciated about se-ipsic controls that it is these, and not allotrious ones, which are used by every patient and every medical practitioner for gauging the efficacy of treatment. Another important point to note is that se-ipsic controls constitute, when we are dealing with hopelessly chronic cases or those which are steadily going from bad to worse, by far the most convincing controls. Let us remember from the New Testament the man who was born blind and was made to see, and note that he stood his ground against the Jewish sceptics by his simple statement, *One thing I know, that, whereas I was blind, now I see.*

THREE TECHNICAL TERMS EXAMINED

So far, I have been regarding only the lacunæ in the vocabulary of statistical experimentation. But there is, in connexion with every scientific vocabulary, this further point to be regarded: that there are in each inchoate science certain special technical terms which the enthusiasts for that method specially insist upon. And if the points which are so emphasised turn out to be dubious or unimportant, that of course does not exalt the credit of the science. It will, to furnish illustration of this point, suffice to comment briefly on the word "significant," and the expressions "random sampling" and "probable error," which figure so prominently in the vocabulary of Statistical Experimentation.

First, with regard to the term *Significant*, the statistician is wont to lay it down as dogma that the results which emerge from a comparison of the inscripts with the contra-scripts must show a certain percentage difference before any value can be attributed to the statistical result. It is customary to say that a 10% difference is the least which can be considered conclusive. This pronouncement is obviously wrong. For if the working error of a statistical experiment could be so reduced that only the "error of chance" remained over, and if, in addition, the numbers of cases dealt with were sufficiently large to reduce that error of chance to insignificance; differences of much less than 10% would immediately become significant.

I pass to the term *Random Sampling*. This term has been used by statisticians to call attention to the fact that the "community" (the statistician is wont to call it the "population") operated upon must be equitably assorted into inscripts and contra-scripts. The term random sampling altogether fails to bring that home to the mind, for since all sampling worthy of the name is random sampling, the application of random to sampling does not, as a matter of fact, convey censure. If anything, it implies commendation.

Lastly, we have to consider the term *Probable Error*. This properly means the error which is imported into statistical results by chance when this constitutes the only error. The term probable error is, in accordance with that, applicable only to statistical experiments like those of Pascal and Bernoulli which were done by throwing dice or tossing coins.

In such experiments there is, as will be realised from the following, no operational error which could vitiate the result. For the "erg" or driving force here brought into operation—that is, the successive shakings of the dice-box and the tossing up of the coin—are, for all practical purposes, replicative operations. And with that the first of the requirements of statistical experimentation is definitely satisfied. Further, the dice and coins which are employed in the sequence or sequences of experiments considered may be said to be exact replicas the one of the other. And with that the second requirement of statistical experimentation is satisfied. Finally, the "eventus" of the experiments which were carried out by Pascal and Bernoulli—that is to say, the number of pips on the up-turned faces of the dice, and the face upon which the coin falls—cannot possibly be misread.

That finally eliminates all operative fallacies which are incidental to statistical experiments, and leaves over only the fallacy of chance. And this—the so-called probable error—is of course inversely as the number of times the experiment is repeated.

* Extract from an unpublished lecture, given at the Institute of Pathology and Research, St. Mary's Hospital, Paddington, on April 27, 1937, to appear as an appendix to vol. IV. of *Collected Researches* (Heinemann).

1. Growth and Structure of the English Language, p. 51.

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SURGICAL GLEANINGS FROM THE MIDDLE EAST

NORMAN J. LOGIE, MB ABERD, FRCS
TEMP. LIEUT.-COLONEL RAMC

THIS article consists of surgical "bits and pieces," learnt and relearnt at base and forward areas in the Middle East. Some of what we came to take as common knowledge may be new to colleagues who have so far had no practical experience of war surgery.

Though one cannot dogmatise for other conditions, the basic principles of surgery are the same the whole world over, and they must not be ignored or flaunted. Chemotherapy, the closed treatment of wounds and blood-transfusion are important developments, but they are not the whole story and, like everything else, they can be abused and misused. Indeed, by their proved value and simplicity, they can be a menace. Witness the remark "But Sir, it is sulphonamide" made by an operating-room assistant—and a good one too—when remonstrated with for blowing down the exit tube of an insufflator containing sulphonamide powder in an attempt to clear it during an operation.

FLUID AND FOOD

Fluid and food are two great therapeutic agents whose value is not sufficiently recognised.

Fluid.—In the Middle East dehydration was often seen in the wounded. This was not to be wondered at, for water was scarce even in "quiet times." The fluid balance of the body was therefore finely adjusted, and it was easily upset by the mental and physical stress of battle and increased lack of water—all aggravated by wounding and associated loss of blood. To see an ill exhausted patient fill out and bloom overnight, like the proverbial rose, by merely securing rest and giving plenty of fluid by mouth or intravenously, was an impressive lesson in the value of rest and fluid to the body.

Fluids should also be forced, and a daily diuresis obtained by an early morning pint of tea, for all recumbent wounded patients, whether or not there is an osseous lesion; for decubitus renal calculi are by no means uncommon. Even in the fit, there was an increased tendency to urinary lithiasis.

Food.—The diet of the badly wounded, especially those with large suppurating wounds, does not get the attention it merits. They suffer from "toxæmia," they lose body fluids and protein in the discharge; they become anæmic (in war-time more anæmia is seen in surgical than in medical wards); and they lose their appetite and powers of digestion, so that their losses are not made good and a vicious circle is initiated. An attempt—somewhat empirical but encouraging—was made to overcome this by supplying vitamins in whatever form they were available and acceptable to the patient; a simple iron mixture and, if the hæmoglobin was low, blood-transfusions were given. In addition, it was thought that the transfusions would help to replace the protein loss. They were nursed under cover in the open if possible, and exposure to sunlight was controlled. Small repeated feeds, which were made as appetising as possible, were given instead of routine meals, and beer or stout were not withheld if desired and obtainable.

WOUNDS OF SOFT TISSUES

Owing to the extensive use of anti-personnel mines and bombs, multiple peppering, penetrating, and perforating wounds of the lower limbs were common. They were a problem to treat for (1) they varied in size from minute punctures, of unknown depth, to large lacerated wounds; (2) the size of entrance wound was no indication of the depth or the amount of harm done to the underlying tissues; (3) most of the fragments were retained, because of their low velocity; (4) on penetrating the deep fascia they often had an explosive effect, doing damage out of all proportion to their size. Thus in a single limb one might be faced with many problems in treatment to which there was no single answer. Manifestly all the wounds did not require extensive procedures, but some of them did, and it was hard to differentiate. There was also the question whether to remove the foreign body or not.

Probably the least unsatisfactory method of dealing with these cases was as follows. After the preliminary preparation of the limb with soap, water and a nailbrush, each wound was rapidly explored with a pair of artery or sinus forceps, and classified into one of three groups:—

(*a*) Those in which only skin was punctured.
(*b*) Those in which skin was punctured and undermined but the deep fascia was not penetrated.
(*c*) Those in which the deep fascia was penetrated.

For wounds in group (*a*), if not large, the initial soap, water and nailbrush cleaning was enough—any retained dirt or foreign body being lifted out with a spoon. When the skin was undermined (group *b*) the track was laid open and any retained dirt or foreign body was removed with a spoon.

If the deep fascia had been penetrated (group *c*) the wound was enlarged, with the least possible excision of damaged skin (there is a regrettable tendency to excise too much skin; this in itself creates a lesion which requires treatment), the deep fascia was incised and the wound was gently explored with a finger. With experience the damage can often be estimated by feel alone, but enlargement of the wound for visual examination is essential. Devitalised muscle loses its normal firmness and resistance, feels pulpy, does not contract on stimulation and does not bleed. Depending on the amount of damage done, the surgical procedure varied from extensive debridement, with excision of devitalised tissue, to merely laying the wound open and incising the deep fascia longitudinally and/or transversely to relieve tension and secure drainage. Many wounds were not seen early enough for proper excision, and for these the aim was adequate drainage and relief of tension. The use of rubber drainage material proved unsatisfactory and we relied on laying the wounds well open and dressing them with soft-paraffin gauze.

SKIN-GRAFTING

Early skin-grafting is advisable for all wounds with a skin defect. Healing is hastened, contractures and weak scars are avoided and earlier return to duty is obtained.

The "pinch" graft is the best for general use; it is easy to do, and, because it allows free drainage between the grafts, it will "take" in wounds which are by no means aseptic, and therefore can be applied earlier than other forms of graft. The wounds should be rendered as clean and healthy as possible and the percentage take can be increased by applying sulphanilamide to the raw area before grafting.

REMOVAL OF FOREIGN BODIES

Never set out to remove foreign bodies, per se, without X-ray localisation. Do not try to remove foreign bodies just because they happen to be present.

If the foreign body was felt while dealing with the wound and could be easily removed, we removed it. Otherwise, unless there was a special indication for its removal—e.g., size, involvement of important structures causing symptoms, situation between bone ends, or at a later date complications such as abscess formation—no special attempt was made to remove it. Such searching can cause more damage than the foreign body had or will: it is often needless and futile.

Two facts are worth remembering when searching for a foreign body in a fresh wound.

(1) The position of the limb on the table is not necessarily the position it occupied when wounded; so readjustment of the limb's position will open up or align the track. The tracing of a track through muscle is more easily done by feel than vision and by the finger than by instruments.
(2) The position of the foreign body is often betrayed by an area of tenderness and/or swelling of undamaged skin away from the site of wounding—e.g., tenderness over the inner side of the thigh with a wound on the outer side. In such cases the foreign body is more easily approached and removed through a fresh incision over it.

After the wounds had been dealt with, they were sprinkled with sulphonamide powder and covered with paraffin gauze and the whole limb was then encased in plaster-of-paris.

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"Packing" is an unfortunate term which has crept into use to describe the application of paraffin gauze to a wound. To many minds it means the ramming-in of the gauze—a thoroughly bad procedure. Paraffin gauze should be laid in a wound; if the wound requires "packing" it has not been opened widely enough. Too often ribbon gauze was poked into holes where it acted like a cork in a bottle, sealing up discharge and giving rise to abscess formation or cellulitis and hence to further avoidable surgery.

Large-mesh gauze has all the above vices in greater degree and should never be used. It tends to be incorporated in the wound by the granulation tissue growing into and through the meshes instead of being extruded as is paraffin gauze. Removal then needs an anæsthetic, granulation tissue is ripped out, bleeding follows, and healing is retarded.

CLEAN THROUGH-AND-THROUGH BULLET WOUNDS

These should not be explored unless there is rapid swelling, in which case the wound should be opened up, the clot evacuated and the bleeding point tied. Increasing and unrelieved swelling and pressure jeopardises the vascularity of the part, with possibilities of gangrene, infection, and secondary hæmorrhage; or a false aneurysm may develop later, whose treatment, because of fibrosis and the melting of tissues and important structures, may be difficult.

Beware of an "abscess" in the popliteal fossa, groin, antecubital fossa or axilla, when associated with an "old" wound; for a traumatic aneurysm can closely simulate an abscess, and more than one has been incised, much to the consternation of the surgeons. Provided that the vitality of the limb is not risked, operation on traumatic aneurysms should not be undertaken early; collateral circulation should be given time to become established.

Finally, it cannot be repeated too often that, with the exception of wounds of the head, small sucking chest wounds, and deliberate abdominal incisions, no war wound should be closed by suture in the forward area.

HÆMORRHAGE

To control bleeding, a firm dressing nearly always suffices; packing is seldom called for and a tourniquet practically never.

Packing to control hæmorrhage is as potentially dangerous as any tourniquet, and the same precautions should be taken—i.e., the attention of all concerned should be drawn to the fact that a pack has been employed, its time of insertion should be noted prominently, and a request that it be removed at the first available opportunity should be made. Pain, sloughing tendons, damaged nerves, spreading cellulitis and secondary hæmorrhage have all been seen as sequelæ of packing.

If a *tourniquet* must be used it should be applied as near the wound as possible on the proximal side, especially if the limb is so badly damaged that its amputation is a foregone conclusion. When placed thus in these cases, it can do little further harm and can be left in situ until surgical help is available. Never apply a tourniquet directly to a limb, especially if it is of the usual rubber-tubing type; always protect the skin. If on slackening the tourniquet it is found necessary to reapply it, shift its position slightly; this will prevent it from biting into the tissues at one site.

Never use a tourniquet if operating for gas gangrene; it interferes with the assessment of the viability of the muscle, and it also causes further trauma, cuts off the blood-supply and increases the chance of spread.

If a main artery is wounded, *ligatures* should be applied to it both proximal and distal to the wound, and also to any branch leaving it between the sites of ligation; and the associated vein should be tied. Proximal ligation is not enough.

GAS GANGRENE

The treatment of gas gangrene still lies in adequate surgery of the initial wound—devitalised tissue should be excised, tension relieved, and the wound laid well open. Gas-gangrene serum (polyvalent) should be given in full doses despite the introduction of chemotherapy, with which, however, it should be combined. In the treatment of an established case, excision of the affected muscles, or amputation, sulphathiazole by mouth and locally, and massive doses of polyvalent gas-gangrene serum up to 40,000 units and repeated, should be given in a continuous intravenous saline-glucose drip.

Gas gangrene is a disease of muscle and not skin; so skin flaps can always be fashioned with safety when amputation has to be performed. They should either be folded back or held apart with paraffin gauze and closed later on. By bearing this in mind, length of stump can be conserved.

AMPUTATIONS

Early amputation of a mangled limb can save life. Save all you can of a limb; never attempt a finite amputation in the forward area—they all go septic. A below-knee amputation at the site of election which goes septic means either an unsatisfactory stump or reamputation in the thigh; and sepsis at the latter, which could have been avoided, is a tragedy.

Avoid the pure guillotine amputation; these patients were the most miserable and pain-racked cases seen. Flaps can always be formed and approximated loosely with interrupted sutures over a liberal sulphonamide-paraffin dressing which should project from one end for drainage. They should never be sutured tightly.

If an amputation has to be done so near the knee that an unsatisfactory or flapless stump would result, the value of disarticulation of the knee should be remembered. It is easy to do, produces less shock, leaves a less painful stump with no raw bone ends or muscle mass to go septic, and does not interfere with future amputation in the thigh.

If the flaps should be at all short, extension should be applied. This can be done by means of ordinary strapping extension attached to the end of the Thomas splint.

A plaster cap moulded like a finger-cot over a paraffin-dressed stump affords protection and support, and can readily be slipped off if the stump has to be inspected.

PLASTER-OF-PARIS

One of the greatest virtues of plaster is that it keeps people out; for it is surprising how few can resist taking other people's dressings down—even when there is no indication to do so.

All plaster casts should be split before evacuation (not bivalved); this allows for swelling, removes any risk of pressure gangrene, and allows of easier removal (if required) in the absence of plaster cutters. Do not cut windows in plaster applied to a freshly injured limb, for this always leads to "herniation" of the underlying tissues.

Do not apply skin-tight bandages, wet or dry, to the limb beneath plaster, to keep hairs from sticking; if the limb swells, the bandage can do as much harm as the plaster. Smooth the hairs down with plenty of soft paraffin if the limb cannot be shaved. This has the added advantage that the healthy skin is protected from infection by the discharge from the wound.

Always support the toes, but do not hyperextend them. Though it is unnecessary to carry the plaster beyond the toes for this purpose, it is advisable to do so in the forward areas, for it helps to keep the blankets from pressing on them in the absence of a cradle. In addition, by punching a couple of holes in the plaster toe-piece and threading a bandage through them, the limb can be slung up. Beware of the external popliteal nerve if a below-knee plaster is applied, for palsy of this nerve is not uncommon for this cause alone.

For evacuation the following information should be printed on the plaster with an indelible pencil.

1. Date of wound—e.g., 9/2/42.
2. Type of wound—e.g., S.W. cpd. Tib. Fib. (shell wound with compound fracture of tibia and fibula).
3. Date of operation—e.g., 9/2/42.
4. What done and dressing—e.g., Wd. Toilet. S & V (wound toilet sulphonamide and 'Vaseline').
5. Rough drawing of the wound or fracture.
6. Unit at which treated.

This is simple to do, does not take a moment and tells the MOs behind all they want to know at a glance, without fighting to find and decipher the usual illegible field medical card. But do not write on the plaster over the wound, for discharge and soakage will obliterate the writing.

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Never forget to examine the toes or fingers after application of the plaster. The occurrence, or continuation, of pain beneath any dressing calls for investigation, and this applies with special force to plaster. Pain may be the first indication of gas gangrene, especially that due to *Clostridium œdematiens*. Never apply plaster to a segment of a limb, for with swelling of the limb it can become a tourniquet.

Always fix joints in the best functional position. In the case of the hand the plaster should not extend beyond the palmar crease, so that all the finger movements are free. The *absolute necessity for keeping the digits free and mobile is not sufficiently realised*; avoid by active and/or passive movements a "frozen hand." This applies with special force to nerve injuries. If the fingers and thumb have to be fixed, the former should be slightly flexed with the thumb opposed to the forefinger and not extended as is the common mistake. For injuries of the hand, foot, or ankle, plaster should be carried to the elbow or knee; for injuries of the wrist, forearm or leg, it should be carried to mid arm or thigh. Never leave feet or hands dangling from a plaster; always include them, otherwise foot-drop or toe-drop, or pressure sores at ankle or wrist, will develop. All injured lower extremities should be evacuated elevated. Two stretcher bars adjusted over the injured limb on the stretcher make an excellent cradle and from them the limb can be slung either during transit or while applying plaster.

Do not persist with the closed-plaster treatment of wounds too long. There comes a time when every wound benefits from a change of treatment—e.g., early skin-grafting—and every limb from release from its cage within which it has soaked in discharge and atrophied from inactivity with its skin macerated, its muscles fibrosed and its joints stiff.

FRACTURES

The important thing in first-aid treatment of fractures is to stabilise them, for this in itself is a prime factor in overcoming associated shock. As long as the alignment is correct, the actual shortening is of little account, for it can afterwards be overcome by manipulation under anæsthesia or by skeletal traction.

In the operative treatment of compound fractures the bone ends can be brought together; but in the lower limb this should not be done if bone is missing with resulting shortening. Every endeavour should be made to maintain the original length, for if the bone unites the result will be a permanently short limb, whereas a bone gap may be made good at a later date by bone-grafting. Unnecessary gaps, however, are to be avoided, and fragments of bone should not be removed from compound fractures unless they are completely detached.

STABILISATION OF FRACTURES

Plaster-of-paris is the best stabilising agent.

Fractures of the femur and knee-joint are best stabilised by the following method. After dealing with the wound, if any, extension is obtained by pulling on the foot and ankle, or through strapping applied to the limb; this strapping is tied to the end of the Thomas splint after its application. A slab of plaster is moulded to the back of the thigh and leg, extending from natal fold to beyond the toes with the knee bent to 10°. Then one of two procedures should be adopted.

(1) The whole limb is encased in plaster (which must be split), the Thomas splint is threaded on, and finally leg and splint are fixed together by plaster bandages applied round thigh and leg.

(2) The Thomas splint is threaded on the limb and back slab and then the whole limb, plus Thomas splint, is encased in plaster, with a pad placed over the knee and between the limb and the side bars of the Thomas splint.

By this means an absolutely rigid fixation of the fracture is obtained, which does not require readjustment and is trauma-proof. Do not apply extension to the plaster-of-paris, for it is apt to bite into the dorsum of the foot and ankle.

Hip and shoulder spicas should not be applied unless proper facilities exist for their application (i.e., in hospitals). They are not essential; they are hard to apply properly in the forward area; their application takes too long; and they add to the difficulty of handling during transport in ambulances and hospital trains.

Fractures of the shoulder girdle and humerus are best stabilised by fixation to the body; abduction of these fractures has the disadvantages of spicas.

THE THOMAS SPLINT

The Thomas splint is still of inestimable value in the treatment of injuries of the lower extremity, but its use in the forward area requires a word or two of warning.

1. Rather have the ring on the large side than a neat fit, for the limb may swell. The initial large size of the ring can be overcome by an adequate pad on the outer side of the limb. This can be removed if the limb swells.
2. Always loosen the lacing of the boot or remove it. Gangrene of the foot has followed neglect of this precaution.
3. Beware of the clove hitch. If it is applied for any length of time, it is painful, and pressure necrosis may follow.
4. Beware of ring pressure in the ischiopubic region.

The limb should be stabilised and fixed firmly in the Thomas splint. Extension should be used to obtain stability and not with the primary object of restoring length; for, except under the most favourable conditions, it is impossible to obtain and maintain efficient extension of a fracture in a Thomas splint.

HEAD

The prognosis for head wounds is not so gloomy as was thought. They travel well in the early stages, but less well later or after operation. They should be treated conservatively, and if rapid evacuation is possible they should be sent for treatment to a special centre. No scalp wound should be sutured without proper exploration, therefore the regimental medical officer should do no more than remove the hair, clean the scalp, dust the wound with sulphonamide and cover it with a dressing. Excision of scalp wounds should always be minimal.

If the skull is involved, indriven depressed bits of bone should be removed, but an intact dura should not be opened unless it is obviously under tension due to blood clot and this tension is causing symptoms.

If the dura is opened, treat the brain with respect; do not poke fingers or instruments into it. Only remove foreign bodies if they are obvious; do not hunt for them. Do not poke rubber drains into the brain. Close the scalp carefully, and if drainage is considered necessary, do it through a separate stab wound and use soft rubber. Sulphonamides should be applied only sparingly to the brain, for they damage nerve tissue.

X rays and a sucker are essential for adequate brain surgery. The removal of indriven bone is more important than the removal of a metallic foreign body.

FACE

Wounds of the face should never be sutured under tension. They did best if left open, with at most one or two narrow-bit approximating sutures to hold any flap in position. Every bit of soft tissue that can be saved must be left. Unless bone fragments are completely free, they should not be removed. Only in the most favourable circumstances should face wounds be sutured and then by small-bite suturing with interrupted horse-hair or gossamer-silk stitches; but mucous membrane and skin should be opposed in any wound involving both.

GASTROSTOMY AND TRACHEOTOMY

The value of a gastrostomy and/or tracheotomy should be remembered. They can save life in injuries of the upper respiratory and food passages.

CHEST

Be conservative. Sucking chest wounds should be closed, and unless they are small, this is better done with an over-stitched pad covered with paraffin gauze than by pulling skin and muscle together under tension; for sepsis always follows. Never hunt for foreign bodies in the chest in the forward area.

Beware of pressure phenomena. The cause can be ascertained with a syringe and needle: either blood will be sucked out; or air will force the plunger back and,

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if the syringe contains some sterile water, the air will bubble through it. If it is necessary to leave the needle in (e.g., in a pneumothorax) it should pierce a half section of a rubber tube which can be strapped to the chest. A hæmothorax should be aspirated early and kept empty; expansion of the lung is thereby encouraged and infection discouraged. No air replacement should be done.

Unless of minor degree, chest cases should not be evacuated until fit. Do not be afraid of using morphine for a chest casualty.

WOUNDS OF ABDOMEN

The time factor is still paramount in wounds of the abdomen. To operate more than 24 hours after wounding is of doubtful wisdom.

After operation, these cases should be held for the very critical first 7 days at least, if at all possible. Too early evacuation is in itself a cause of death. If the case cannot be held, it is a nice point whether it is not better to evacuate them (provided rapid transport is available), without operation, to a surgical centre which is more favourably placed. The decision depends on the local situation, the type of lesion, and the condition of the patient.

INTESTINAL DRAINAGE

Intestinal drainage and decompression, by suction through a Ryle or Miller Abbott tube, or even an improvisation of either is valuable in peritonitis (potential or actual), ileus or distension. The tube causes less discomfort to the patient, and stays in position better if introduced through the nose rather than the mouth. The use of a tube, with intravenous saline glucose and morphine, is life-saving and is possible in the forward area. Rigid insistence on "nothing by mouth" in these cases is irksome to the patient and is unnecessary with a tube in situ, since fluid can be allowed by mouth and aspirated immediately if need be.

Beware of the solitary wound of buttock, perineum or lower chest. The foreign body is bound to be somewhere and is as likely to be in the peritoneal cavity as anywhere. The abdomen should be radiographed in all such cases. The foreign body can be localised, its probable course determined and the best approach decided on. But remember that though a positive X-ray film is very useful, a negative one does not mean that there is no foreign body, or that the abdominal contents have not been damaged; for the foreign body may be radiotranslucent. The old adage "if in doubt look and see" is still as true as ever. When inside the abdomen do what you have to do and no more; "the simpler, the quicker, the better."

WOUNDS OF THE INTESTINE

Colon.—Small puncture wounds may be closed and the site of suture drained. With larger wounds it is safer to exteriorise the wounded loop and form a colostomy.

Where it is impossible to exteriorise, owing to the number of wounds or their situation (e.g., rectum), the wound in the gut should be repaired, the site drained, and a proximal colostomy formed. If there are several wounds the most proximal wound in the gut may be used to form the colostomy. Such a colostomy, time and condition permitting, should secure complete diversion of the fæcal stream; for efficiency and ease of closure subsequently, the double-barrel type is preferable. A colostomy should be done whenever there are wounds of the anorectal region, and should be considered when there are large wounds of buttock and perineum—to avoid soiling.

Small intestine.—Wounds of the small intestine should be closed if possible. Resection should only be resorted to if the blood-supply of a segment is jeopardised, or suture of closely grouped wounds would result in gross stenosis. Small intestinal fistulæ should be avoided.

Abdominal incisions must be adequate—do not hesitate to use an unorthodox incision if it improves exposure. Explore the abdomen systematically; deal with hæmorrhage first and other lesions as you find them, to obviate handling and rehandling the viscera. Use sulphonamide powder, but not more than 10 grammes in a finely powdered form. Avoid sulphapyridine.

Mortality.—Is this as high as in the last war? Among other encouraging figures (admittedly small but unselected) we had at Tobruk in a "quiet period" 8 survivors out of 10 consecutive cases. It must be admitted that we got them early and conditions were relatively good.

SPINAL CORD INJURIES

Suprapubic cystostomy should be done in all cases with paraplegia; for without exception they had a grossly infected bladder, whether treated by repeated catheterisation or by transurethral drainage. One, with an indwelling urethral catheter, had not only a cystitis but also a gangrenous urethra.

The "blind stab" method of doing a suprapubic cystostomy should never be attempted; for these bladders, unlike those of the "prostatic," are flaccid and toneless and fall away in front of the trocar and cannula so that transfixion of the bladder is easy, with subsequent damage to other structures. The bladder should always be deliberately exposed; and, before puncture by knife or trocar and cannula, see that it is firmly held; for, on emptying, it falls away and can be hard to find.

The suprapubic tube should be so sited and fixed that it drains the depth of the bladder. If the tube is not fixed it tends to work its way out and hug the roof of the bladder (to prevent the tube coming out altogether a De Pezzer or Malecot should be used) so that a "sump" of decomposing and infected urine is left and only the supernatant fluid is drained off. At the same time it is difficult to site the tube accurately; for if it goes too far in it will press on the trigone or bladder neck, and though in paraplegia this will not cause bladder spasm and pain, it will cause ulceration. This difficulty can be overcome by bladder lavage, and while doing it, pushing the tube well in and washing out the bladder with a bladder syringe; merely running lotion in and out will not remove the debris, just as stirring the top of a cup of tea will not dissolve the sugar at the bottom. To ensure spontaneous closure of the fistula, if the bladder function returns, a long oblique track should be formed by bringing the tube out half way between symphysis and umbilicus. The urine should be kept acidified and the catheter changed every 10 days.

The advantages of a suprapubic cystostomy are that it makes nursing easy during transit; for only a cork need be extracted at intervals (at a pinch the patient can do this) to empty the bladder and prevent over-distension. It does away with the need of repeated catheterisation, which may have to be attempted by unskilled hands with increased chance of infection or failure. And, finally, it removes all fear that, through lack of catheters, distension may be relieved only at long and irregular intervals. A suprapubic cystostomy should be done in all cases of urethral damage.

BURNS

An account of my experience of the treatment of burns in the Middle East may be found in *The Lancet* of May 15, 1943 (p. 609).

CHEMOTHERAPY

The true value of the sulphonamides in the prophylaxis of wound infection has not yet been settled. The majority of the wounds arriving at the base after prophylactic treatment were more often infected than not, but without worrying constitutional symptoms. Clearly sulphonamides should be used, and since sulphanilamide is the least dangerous and the most soluble of them, it is the best for general employment, both by local application and by mouth. But:—

1. Chemotherapy cannot supersede adequate surgery.
2. Beware of applying sulphanilamide to extensive raw areas (e.g., burns), for it is rapidly absorbed and the concentration in the blood may become dangerous.
3. Nerve tissue can be damaged, so be cautious in its use in wounds involving or near nerves.
4. Anuria may follow, especially where fluid is restricted. This danger is least with sulphanilamide.

Local application.—There is no need to pack a wound with sulphonamide; a simple sprinkler can be made out of any pot by tying gauze over its mouth. The fineness or coarseness of the layer can be regulated by the number of layers of gauze used.

Introduction of sulphanilamide into cavities or awkward sites is facilitated by using a glycerin suspension which can be forced along a rubber catheter by means of a syringe; or if it is available in "toothpaste" form the catheter can be adjusted to the nozzle of the tube.

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Oral administration.—In practice it was found difficult to be sure that the patient got his tablets four-hourly throughout a journey. This can be overcome by giving bigger doses twice daily—e.g., at 08·00 hours and 18·00 hours, either on the journey or before leaving and on arrival at his destination for the night. Then there need be no worry about when he got his last dose; he got it on the morning and his next is due at 18·00 hours. In the Middle East a special label was provided for which the doses were entered.

TRANSFUSION

A "shocked" patient who appears otherwise fit for surgery and does not respond to adequate resuscitative measures in one to two hours, or relapses, should be reviewed to find the cause for his non-response—e.g., internal or external hæmorrhage, involvement of peritoneum or mangling of a limb.

Transfusion should be early and adequate; there is a tendency to place too much reliance on a pint or less of blood or plasma. The aim should be an early restoration of the blood-pressure (as measured by a sphygmomanometer) to normal, and a pulse of good volume. In a proportion of cases the blood-pressure will rise but not to normal, and here there is a danger that by waiting the golden opportunity for surgery may be lost. In these cases, if operations are necessary, they should be proceeded with, for the lesion itself may be the cause for the failure to respond. Patients who require transfusion before operation should be transfused during and after the operation; relapses after the giving of the anæsthetic alone are not unknown, apart altogether from those due to the operation.

If a patient has to be evacuated before resuscitation is complete the transfusion should be continued during evacuation.

In transfusing for shock due to hæmorrhage the "drip method" is too slow. The blood should be run so that an early restoration of blood-volume is obtained.

ANÆSTHESIA

'Pentothal' is an ideal anæsthetic for the forward area provided it is used intelligently; the fact that it is put up in doses of 1·0 g. and 0·5 g. does not mean that 0·5 g. is the minimum for all cases—which is obvious but sometimes forgotten. If this is remembered pentothal can be given to ill patients. Induction is rapid and pleasant, and prolonged anæsthesia can be obtained by the drip method. Postoperative upset is minimal, and nasal intubation makes it possible to control the depression of the respiratory centres by maintaining a clear airway and giving oxygen if necessary. Where complete muscular relaxation is wanted pentothal can be reinforced with gas-and-oxygen or ether. It is sufficient in itself for all soft-tissue injuries.

EQUIPMENT

Scissors.—A curve-on-the-flat blunt-pointed sharp pair of scissors is more useful in debridement than a scalpel.

Scalpels should be carried as well as knives with detachable blades; they last longer, are stronger, and can be sharpened and resharpened, and there are no blades to run out or be lost. The scalpel can be used for plaster work, a job for which the other is useless if not dangerous.

The old-fashioned bullet-extraction forceps are still the best instrument for the extraction of foreign bodies. A small self-retaining retractor is worth another pair of hands. As ligature material, a reel of linen or cotton thread which can be boiled saves space, catgut and money.

Operating sheets with a hole in them are of more use and are handier than the usual sheets and towels. Limbs or the head can be threaded through the hole, or it can be adjusted over the abdomen or chest as required. Where laundry, replacement and sterilisation are difficult or impossible, a couple (or more) waterproof sheets of batiste, mackintosh or rubber, with a hole in them, are of inestimable value, for they can be scrubbed or washed down with a strong antiseptic, or soaked in it, dried and used and reused.

A single surgeon can get through more work in a given time, and the energy of the orderlies can be conserved, by using two tables and keeping the patients on their stretchers while operating. By so doing the surgeon's time is not wasted in waiting for essential preliminaries, such as cutting off clothing, cleansing and anæsthetising. He is also freed at the end of the operation to proceed with the new case on the other table, while the dressing or plasters are being applied by a well-trained operating-room assistant.

CONCLUSIONS

Surgical principles must be followed, but detail of treatment depends on the local circumstances. For example, aerial evacuation may modify several of the above suggestions, such as the retention of certain types of wounds in the forward area.

Tension in wounds should be avoided, whether caused by suture, "packing" or plaster.

Chemotherapy, blood-transfusions and plaster-of-paris have dangers of their own and must be used intelligently. They are allies and not masters.

RELATION OF THE LYMPHATIC GLANDS TO IMMUNITY AGAINST TUBERCULOSIS

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Le Gros Clark (1939) has stated that the lymphatic tissues are much more evident during the early years of growth. Harris et al. (1930) consider that lymphoid tissue in man reaches its maximum development about the twelfth year, and then shrinks, at first rapidly, later more gradually. If it is true that the lymphatic glands act as a barrier to the invasion of the blood-stream by tubercle bacilli, this barrier should be most effective in childhood and there would be less protection in infants and adults.

Clinical evidence supports this assumption. For example it is well known that the catarrhal child who is the subject of lymphoid hyperplasia is rarely tuberculous. It has previously been shown by one of us (Wilkinson 1940, 1942) that, in a series of patients suffering from non-pulmonary tuberculosis, disease of the lymphatic glands was much commoner in children than in adults; that patients admitted for the treatment of tuberculosis of the lymphatic glands did not present associated hæmatogenous lesions; and that only a minority of patients (40% of children and 17·9% of adults) admitted for the treatment of hæmatogenous forms of tuberculosis had discernible lymph-gland lesions. Also the incidence of multiple tuberculous lesions, which could be regarded as evidence of a previous bacillæmia, was found to increase in the older age-groups. Therefore the conclusion was drawn that lymphatic glands, especially in childhood, did exert a barrier function and that severe bacillæmia was uncommon when there was a definite tuberculous adenitis.

In this article the effect of tuberculosis of the lymphatic glands on the development of a lasting immunity will be discussed. Marfan (1931) expressed the opinion that children who developed lymph-gland tuberculosis in childhood were protected from phthisis in later life. This view is confirmed by our experience at this sanatorium where more than 400 patients, mostly children, have been treated since 1930 for tuberculosis of the cervical, thoracic or abdominal glands. Follow-up reports of 101 of these patients were received during 1938 and none had developed hæmatogenous or phthisical lesions. No complete follow-up has yet been possible but it can be said that no patient treated for glandular tuberculosis at this sanatorium has required readmission for a fresh tuberculous lesion other than in the glands, though many of them have now passed the age of adolescence, and—in the case of the female patients—would have been directed here if further treatment had become necessary. The incidence of tuberculous adenitis in these patients therefore had not predisposed them to further attacks of tuberculosis.

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ANALYSIS OF CASES

It seemed possible to carry the investigation further and to test the truth of the theory that tuberculous lymphadenitis in childhood produces a degree of immunity in the adult, by an examination of a large series of patients suffering from phthisis to see whether evidence of previous lymphadenitis was common in such cases. This was done; and evidence of healed tuberculous lymphadenitis was found in only 3%, or 32 patients out of a series of 1038 suffering from phthisis. This figure may be compared to that quoted by Osler (1920) that 3·2% of one series of 2000 patients showed scars from adenitis. In our series, 27 of the 32 patients had benign or sluggish disease; only 5 had progressive disease (table I). Therefore in this series of more than 1000 patients suffering from phthisis only 5 who had progressive disease had evidence of healed tuberculous adenitis.

TABLE I—PATIENTS SUFFERING FROM PHTHISIS WHO HAD HEALED TUBERCULOUS LYMPHADENITIS (in a series of 1039, classified according to the severity of their disease)

Type of disease	Healed cervical adenitis	Healed thoracic adenitis	Total
Benign ..	1	6	7
Sluggish ..	9	11	20
Progressive ..	1	4	5

It may also be noted, though not relevant to the present argument, that 12 (1·2%) had active tuberculous lymphadenitis.

It seemed possible further to test the truth of the theory by an examination of the family histories of the 1038 patients in order to contrast the severity of the disease present in those who had some familial contact in childhood and those who had not. Kayne (1942) and Pagel (1942) have shown that the glandular component of the primary complex is more definite in childhood than in adult life. This accords with the usual clinical experience that tuberculous lymphadenitis is commoner in children than in adults. If, therefore, the patients in the group who had familial contact in childhood developed their primary infection then, they would have developed a more serious degree of tuberculous lymphadenitis than those in the group who developed a primary infection in adult life, and should have shown a better resistance. Table II shows that this in fact was the case. The patients noted as having familial contact in childhood were those who had a family history in father, mother, uncle or aunt; those noted not to have a family contact in childhood were those who had a family history in brother, sister, cousin or a negative family history. It will be seen that the incidence of the disease in this series was very much less in those patients who had familial contact in childhood; and that in the group who had childhood contact only 43·5% developed progressive phthisis as compared to 61·3% of the other group.

TABLE II.—1038 PATIENTS SUFFERING FROM PULMONARY TUBERCULOSIS (classified according to the family history and the severity of their disease)

Type of disease	Familial contact in childhood	No familial contact in childhood
Benign or abortive	56	124
Sluggish	66	194
Progressive ..	94	504
—	216	822

It seems reasonable to suppose that those who develop some degree of tuberculous lymphadenitis in childhood, also develop a degree of immunity to tuberculosis. In this respect the observations of Kayne and Pagel are especially relevant, for Kayne concludes from an examination of various statistics that at least half the persons in civilised communities first become infected with tuberculosis after adolescence has been reached. They are also of the opinion that bronchogenic tuberculosis may develop rapidly after the primary infection in an adult. Immunity against tuberculosis can therefore best be achieved during childhood. The question remains whether active immunisation at this time of life will ever become possible.

Our thanks are due to Dr. W. A. Bullough, county medical officer of health, Essex County Council, for permission to publish work on these patients; to Dr. W. Burton Wood (since deceased), consulting chest physician to the Council, and to Prof. S. P. Bedson for valuable advice; to Dr. Burton Wood and Dr. R. C. Cohen for use of the case-records of patients suffering from pulmonary tuberculosis; and to the Tuberculosis Officers of the Essex County Council for the reliable records of the patients' family histories.

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GUNSHOT WOUNDS OF THE ELBOW-JOINT*

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AFTER the third Libyan battle fought in the summer of 1942, records were collected of 51 wounds involving the elbow-joint. As reports were received from all hospitals the number is likely to be nearly correct and compares with 165 wounds of the knee-joint during the period.

Suppurative arthritis developed in 31. The other 20 are reported as non-suppurative arthritis.

Amputation was performed in 2 cases.

Death occurred in one Indian on the 9th day.

I had the opportunity of seeing many of the cases, but in order to get useful information on specific points, the surgeons were sent a proforma to complete, and much of this record is the result of analysis of their reports.

EARLY TREATMENT

All except one case had an "operation" in a forward area. The usual sequence of events was the application of a first field dressing or "shell" dressing, and a sling; in some cases splinting was superimposed. Antitetanic serum was given at a field ambulance dressing-station. The wounded man was transferred to a forward operating-centre as early as circumstances allowed. If he passed through "staging units," the dressing was not changed unless it was saturated with blood. The forward operating-centres were at field ambulances, when the theatre was usually a tent or tarpaulin on the side of a large truck, at a casualty-clearing station, usually with a tented theatre, or at a well-housed hospital in Tobruk.

The shortest interval between the time of wounding and operation was 11 hours, and the majority (both non-suppurative and suppurative elbows, as it turned out) were operated on 24 hours after the wound was received.

A number of elbows were radiographed before operation, but the basic principle of the forward operation was to "treat the wound" rather than spend time on dealing with the fractures or joint injury. Hence the operation carried out was excision of skin edges of jagged and necrotic tissue, followed by removal of loose pieces of bone. Hæmostasis was obtained, the wound was dusted with sulphanilamide, a soft paraffin gauze pack was inserted, and the limb was placed in plaster-of-paris from axilla to metacarpal necks. The latter appears to have been used for every case. A sling was applied and the patient transported to the base, having started a course of oral sulphanilamide, which was continued until 20–25 grammes had been given in five days.

The shortest period between being wounded and reaching a base hospital was within 48 hours and the longest 11 days.

* Read before the British Orthopædic Association on Oct. 30, 1943.

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AT THE BASE

At the base there were two groups of cases to consider.

1. When the wound was due to a bullet or small metallic fragment, the plaster was little soiled and the general condition satisfactory, unless other wounds were present. The plaster was not removed for some days. The joint was radiographed and either another plaster was applied or a dressing was placed on the wound; the only form of splinting employed was a "collar and cuff."

2. If the general condition was affected and the plaster considerably soiled, the plaster was removed within a day or two of reaching the base. After X-ray films had been taken, detailed examination of the wound was made under anæsthesia. In 18 patients an operation was performed within a few days of reaching the base. This consisted in incision to enlarge the wound to improve drainage—sometimes with removal of a metallic fragment or loose pieces of bone.

Plaster-of-paris was usually reapplied. At one hospital a window was cut in the plaster and irrigation employed for large wounds.

INCIDENCE OF FRACTURES

There was no fracture in 3 cases. One of these had the joint opened in front, a missile the size of a lump of sugar injuring the anterior ligament.

Table I shows the great variety of bony injury.

TABLE I

Humerus alone into joint	10	Radius	4
Humerus + external epicondyle	4	Radius and ulna	2
Humerus + dislocation of radius	1	Olecranon	9
Humerus + radius	2	Coronoid	1
Humerus + radius and ulna	10	Joint destroyed and dislocation of radius	1
Humerus + olecranon	3		
Humerus + olecranon + dislocation of radius	1		

It will be seen that there was severe bony damage in at least 4 out of every 5 joints injured. It should be noted that the olecranon was fractured in nearly half, for where the upper end of radius and ulna are mentioned, the olecranon was almost certainly involved.

INCIDENCE OF NERVE LESIONS

In the 51 elbows, diagnosis was made in the Middle East of injury to 14 nerves in 12 patients (table II).

TABLE II

		Time of recovery
Median nerve, complete	1	4 months
Median nerve, partial	1	Not known
Ulnar nerve, complete	1	Not known
Ulnar nerve, partial	1	4 months
Musculospiral nerve, complete	2	(*a*) A few weeks (*b*) 6 months
Posterior interosseous nerve	4	(*a*) 2 months (*b*) 6 months (*c*) and (*d*) 4 months
Double nerve injury		
Ulnar and musculospiral, partial	1	2 months
Ulnar and median	1	5 months

In addition paralysis of two ulnar nerves was diagnosed in South Africa, which was overlooked or not present when the patients were in the Middle East.

		Time of recovery
Ulnar nerve, complete	1	7 months
Ulnar nerve, partial	1	3 months

Thus there was evidence of injury to 16 nerves. Of these 9 had recovered in four months or less, 5 had recovered in under seven months, and the fate of 2 is not known.

As the olecranon is so often injured, it would be expected that there would be destruction of a portion of the ulnar nerve in more cases than this record shows. Further, it is remarkable and satisfactory that the nerve damage was largely confined to intraneural or perineural hæmorrhage and œdema and that complete interruption of the nerve-fibres was relatively uncommon. Many of the nerves recovered before the wounds were healed. The assessors of recovery were the surgeons in South Africa under whose care the patient came.

If opportunity enables me to investigate this lesion further, it will be interesting to see whether the findings are similar in another group of patients. It must be appreciated that the less severe cases are not likely to be under long-term observation; so a higher nerve-injury rate is likely to be recorded among any group reaching this country.

I wish to record that the high recovery-rate of the ulnar nerve complicating this lesion was possible owing to skilful primary surgery and to placing the elbow, during the period of acute inflammation, in such a position (at a right angle) that there was not the tension on the nerve that would have been inevitable had the arms been slung in a collar and cuff. The use of this appliance is undesirable, whatever the bone injury, while there is hæmorrhage or œdema around the ulnar nerve.

INCIDENCE OF SUPPURATION

It has been mentioned that suppurative arthritis developed in 31 elbow-joints. Records show that operation was performed on no patient within 11 hours after wounding. The majority of patients who afterwards had either non-suppurative or suppurative arthritis had the primary operation 24 hours after the wound was inflicted.

Profuse suppuration is recorded in some elbows. For example:—

A. B., wounded June 28, 1942. Fragments of bone removed, including the radial head. Wound was sutured. On July 1 at the base the joint was greatly swollen; sutures were removed from large and dirty wounds. In six weeks Eastwood recorded 45° of passive movement.

C. D., wounded March 21, 1942. Operation (36 hours after wounding); filthy wound. Resection of lower end of humerus, with removal of loose pieces of bone and metallic fragments. Reached the base March 28. Hæmolytic streptococci were cultured from the profuse discharge. Treatment by dressings in window cut in plaster. Wound healed by May 14. On July 16 (in S. Africa) the elbow was flail with no voluntary control.

Experience shows that suppuration with osteomyelitis of the bones of the elbow tends to subside quickly, as adequate drainage can be easily provided and sequestra separate quickly and are readily discharged, because the bones are near the surface. If the elbow is placed at a right angle in full supination, and fixed in plaster-of-paris, suppuration does not tend to spread along fascial or intermuscular planes.

TYPE OF OPERATION

The primary operation for this lesion can never be an excision of the injured tissue *en bloc*, except in the few cases where there is a small wound over a lateral ligament, possibly causing a little injury to an epicondyle. The surgeon, therefore, has to carry out the routine procedure for the treatment suitable for any wound, and add to it such operation as is demanded by the fracture into the joint.

The former is designed to obviate or limit infection, and the second maybe to prevent suppurative arthritis or to drain the infected joint. In either case it should be planned with due consideration of the ultimate function of the joint. The general principles to be followed are:—

1. Operative procedures should be on the posterior or lateral side of the joint in preference to the anterior or medial, whenever possible.

2. In a grossly mutilated joint as many loose pieces of bone as possible should be removed, and no spikes of bone should be left protruding into the joint cavity. Should the lower end of the humerus be fragmented (with radius and ulna more or less intact) the fragments should be removed and lower end of fractured humeral shaft cut square.

If the upper end of the forearm bones are in pieces, after removal of the fragments, the proximal ends should be trimmed to be level, if the humerus is more or less intact.

3. When the olecranon is destroyed, all the pieces should be removed.

4. Large fragments of bone should not be removed when partly attached.

5. When a primary excision of the joint is carried out, loose fragments of bone must not be left partly attached to one of the bones, nor in the joint cavity.

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I have been impressed by the results of excision of the mutilated olecranon process. Drainage of the joint is free, a second operation is seldom necessary, the wound granulates quickly, and the end-results are better than in cases treated by other methods.

Excision of the joint has always been more popular in France and Central Europe, and few British surgeons have had much experience of it. In 1940 I noticed the care taken by a French surgeon in removal of all loose fragments of bone, and from later experience I am sure this is essential, partly because suppuration seems to be less when there are no foreign bodies in the cavity. However it should be appreciated that primary excision of the joint is rarely indicated for gunshot wounds.

When there is forward dislocation of the upper end of the radius, it is essential that the reduction should be followed by adequate fixation to hold the dislocation reduced. I have previously drawn attention to the fact that the late treatment of unreduced dislocation gives less satisfactory results than those achieved by correct early treatment.

ASPIRATION AND DRAINAGE

There is less scope for *aspiration* than in the knee-joint. When the wound is small—bomb splinter or such like—no primary operation may be carried out. In this type of case aspiration may be required to relieve tension, to ascertain whether the joint is infected, or in the latter case as a therapeutic measure. It is done with a syringe and large needle. The needle is passed into the area of greatest swelling, which is usually on the lateral side of the olecranon.

Drainage may be established by removal of non-viable tissue on the posterior surface of the joint. In the elbows with a fragmented olecranon free drainage is provided by removal of all the bony fragments. An opening on the medial or lateral aspect made by a missile does not provide efficient drainage.

Rubber drainage-tubes should not be inserted, but the wound packed with soft-paraffin gauze.

When posterior drainage is required and cannot be made through the wounds existing, two incisions are made, one on each side of the olecranon.

SPLINTING

The routine after the primary operation is splinting by plaster-of-paris. Felt padding is required over the epicondyles and olecranon, if not part of the wound. The elbow is placed at a right angle, forearm supinated and wrist dorsiflexed 30°. The plaster extends from the axilla to the necks of the metacarpal bones. This position is chosen, because (*a*) pocketing is less likely than in any other; (*b*) the bones are in almost the optimum position for starting movement later, and (*c*) in cases where ankylosis seems inevitable the subsequent adjustment to a different position is simple.

Should there be extensive destruction of the back of the joint, gauze should be applied lavishly over the wound; for moulding of the plaster over the posterior surface of the joint tends to convert the paraffin pack into a plug.

A large arm-sling is necessary for a time. Shoulder and finger movement should be encouraged.

POSTOPERATIVE TREATMENT

Indication has already been given that some elbows are treated in closed plaster until freed of splinting. Alteration of this routine may be required if dressings through "windows" in the plaster are indicated. Pain or a continued rise of temperature necessitates removal of the plaster and perhaps aspiration or incision.

When symptoms and signs suggest that all inflammation in the joint has ceased and the wound is healed or nearly so, skin-grafting may be required to cover an area over the posterior surface of the joint.

When ankylosis is the ultimate aim the limb is placed in what is considered the ideal position if this has not already been done. If, however, movement is expected, the joint is rested for another fortnight by the use of a collar and cuff or posterior plaster slab. Active movement is then commenced. At first an effort is made to get flexion above the right angle and later exercises to regain extension. The limb is rested by a collar and cuff and in due course suitable rehabilitation is instituted. Should there be any reaction, the joint must be rested longer.

The postoperative treatment of wounds complicated by peripheral nerve injury will differ, if recovery has not occurred during the first few months. Movement may have to be delayed by the necessary nerve operation.

FOLLOW-UP

It has been possible to get records from South Africa by the courtesy of Major Eyre Brook and Mr. G. T. Du Toit, one of Mr. Fouche's assistants. I have studied these in detail and draw attention to the lessons to be learnt.

1. Prevention of stiffness of the shoulder and fingers, particularly of the metacarpo-phalangeal joints, must go hand in hand with the treatment of the elbow-joint. Hence exercises or employment of these joints should be commenced immediately unless the patient is ill. Stress had been laid on this in Middle East, so it was satisfactory to find many hands were reported as 100% function.

2. The use of a collar and cuff and commencement of active movement is not beneficial until the arthritis is quiescent, but should not be delayed unnecessarily long. Nothing is to be gained by passive movement.

3. Some cases with 30° of movement after 8 or 10 weeks proceeded to a fibrous ankylosis.

4. Some elbows with loss of olecranon and severe infection regained up to 70° of flexion extension mobility and half the supination-pronation movement.

5. Recurrent osteomyelitis and formation of sequestra are not common sequels of these wounds when the primary operation is well planned.

6. In this series the recovery from peripheral nerve injury without operation was frequent.

Unfortunately it is impossible to ascertain the end-result of each of this series. Hence any estimate of ultimate function is somewhat speculative. Of the 50 patients who survived, the ultimate condition expected was:—

Ankylosis	17	Movement less than 30°	5
Flail elbow	4	Amputation	2
Movement greater than 30°	22		

Amputations.—The two amputations were carried out because of the extent of the wounds, and none were required owing to septicæmia from suppurative arthritis. Destruction of tissue alone is rarely an indication for amputation. Vascular injury and severe local suppuration, in an ill patient are complications, which may necessitate amputation, but the surgeon should always bear in mind the value of a living hand.

E. F. was wounded on July 5, 1942. The surgical team at a field ambulance cleaned the wound, dressed it with sulphonamide paraffin gauze and immobilised the limb in plaster-of-paris, 24 hours later. He reached the base 4 days after wounding and on July 14 a mid-arm amputation was performed.

G. H. was wounded on May 27, 1942. The wound was excised at Tobruk and on June 7 at the same hospital amputation was carried out owing to the size of the wound and the extent of bone destruction, complicated by profuse suppuration and complication.

Mortality.—The only death recorded was that of an Indian who died 9 days after he was wounded. He had an extensive elbow wound, a severe leg wound with fracture of the tibia and fibula, and many wounds of moderate severity on the body and limbs.

SUMMARY

1. The clinical features and treatment of 51 cases of gunshot wounds of the elbow-joint, received in the Middle East Forces, are recorded. In 31 of these a suppurative arthritis developed.

2. In all but 3 cases there was a fracture and in at least four-fifths of them a bone was seriously damaged. Nerve injury was seen in 14 cases.

3. Treatment and end-results are critically reviewed.

I wish to express my thanks to many divisional officers and surgical specialists, who showed me many of these wounds and for their reports. It is only by their coöperation that a true picture was obtained. The work was made possible by the encouragement and facilities that were always given by Major-General Sir P. S. Tomlinson, Director of Medical Services, MEF.

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DUST AS VEHICLE OF INFECTION IN CHILDREN'S WARDS

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OUR findings in an outbreak of infantile enteritis in the children's ward at the Cardiff Royal Infirmary suggest that in certain circumstances organisms dwelling in the intestine may be conveyed from case to case by ward dust and by clothing.

In the six months from April to September, 1942, of 212 children nursed in the ward, 14 had a *Proteus morgani* infection (all type 1), 4 being admitted with it, and 10 acquiring it while in hospital. The infection was intestinal except in one case where burns became infected, and all but this last patient were under two years old. During the six months there were two complete changes of nursing staff with the exception of the sister in charge whose fæces were free from *P. morgani*. The order of occurrence of the cases is set out in the table.

Case	Sex and age (wks)	Date of admission	Disease on admission	Date onset diarrhœa	*P. morg.* first isolated	Went home (H) or died (D)
1	M 36	April 10	Enteritis	Before adm.	April 13	D April 21
2	F 20	,, 8	Mastoid	April 15	,, 20	H May 5
3	M 9	,, 23	Pyloric stenosis	May 1	May 6	H June 13
4	M 14	May 20	Enteritis	Before adm.	June 20	H July 6
5	M 208	April 3	Burns on back	None.	,, 10	H ,, 28
6	M 64	June 10	Tb. glands neck	June 14	,, 15	H June 16
7	F 6	,, 26	Enteritis, convulsions	Before adm.	,, 30	D July 7
8	F 16	(*a*) ,, 17	...	...	...	H June 28
		(*b*) ,, 29	Enteritis	June 27	June 30	H Aug. 27
9	M 40	July 11	Fract. skull	July 13	July 15	H July 20
10	M 12	,, 30	Hypospadias	Aug. 2	Aug. 5	H Aug. 7
11	M 5	Aug. 7	Toxic gangrene extremities	Before adm.	,, 23	D Aug. 23
12	M 5	,, 19	Pyloric stenosis	Aug. 25	,, 28	D Sept. 1
13	F 24	,, 24	Hare-lip	,, 30	Sept. 3	H Sept. 3
14	F 4	,, 27	Meningocele	Sept. 1	,, 2	H ,, 11

The pattern of the epidemic suggested a ward infection possibly related to *P. morgani* and we therefore decided to try to trace its spread. Since all the cases developing enteritis in hospital were infants maintained on dried milk preparations, we examined the feeds and also the containers, packages and measuring spoons, the feeding bottles, the teats and teat containers, the sterilising jars and the tables on which feeds were prepared, together with the sterilisers and the water contained in them. None of these was found to be infected except a bottle-brush which yielded *P. morgani* on two occasions, July 1 and 5, and since this was used only in the presterilising stage of the feed preparations, it was not regarded as a likely vehicle of spread.

A wound infection in one patient (case 5) suggested air- or dust-borne infection. Plates of MacConkey's agar and of tetrathionate broth were exposed in the wards for 3–4 hours, during times of moderate ward activity, on 6 days, July 16 and 23, Aug. 29, and Sept. 3, 12 and 16. On July 16 and 23 and Sept. 3 *P. morgani* was found in small numbers. Dust sweepings from the ward were also taken on July 21 and 23, Aug. 30 and Sept. 12, about 1 g. of dust being shaken vigorously for 10 min. in a tube containing 5–10 c.cm. of sterile saline. *P. morgani* was isolated in small numbers on July 21 and Aug. 30.

The bed-linen from cases 8 and 12 was investigated on July 2 and Aug. 29 by soaking portions about 2–3 in. sq. in tetrathionate broth and incubating. In both cases *P. morgani* was cultivated. In cases 12 and 14, portions of linen (4 in. sq.) were left overnight beneath the bottom sheet on which the infant lay, and although these squares were not directly fouled by urine or fæces, *P. morgani* was isolated from them in moderate numbers in both cases. These findings showed that during the nursing of infected cases, *P. morgani* was widespread in the wards.

The survival of the organisms in these various fomites was next investigated. Sterile squares of filter paper and blanket were artificially infected by soaking them with an 18-hour broth culture of *P. morgani* and then dried in the incubator. They were subsequently kept at room temperature and examined at intervals. It was found that the organisms could survive in filter paper from 11 to 20 days, while in blanket it could survive for more than 81 days. Dusts obtained from floors and shelves were first sterilised and then infected with an 18-hour broth culture of *P. morgani* and finally dried in the incubator. The survival time varied from 2–12 days, but floor sweepings of large granular particles seemed a less favourable medium for survival than the more finely particulated dust of shelves.

Further experiments were also carried out to see how effective the routine methods of washing garments were in disinfecting them. It was the custom in this ward for woollen garments, because of their liability to shrink, not to be sent to the laundry but to be washed by the ward staff in soap and warm water, and subsequently rinsed in warm water and dried. A woollen garment was artificially infected on three occasions in the way described above and washed by the routine method. In each case after washing, *P. morgani* was found to have survived.

We considered the question of sterilisation of clothing, and since soaking in disinfectant is injurious to woollen garments, formaldehyde as a disinfectant was tested. Pieces of blanket and knitted garments previously sterilised to exclude all other organisms were artificially infected with *P. morgani* and dried. They were then exposed in a sealed chamber to an atmosphere of formaldehyde prepared by heating paraformaldehyde in amounts equivalent to 0·1 g. per cu. ft. space. To ensure a moist atmosphere a beaker of water was also placed in the chamber. In every case exposure for one hour sufficed to make them sterile.

DISCUSSION

It must be admitted that *P. morgani* is not an uncommon constituent of the bacterial flora of infants. In the course of our investigation we examined the fæces of 61 normal healthy children under two years of age and found it present in 3; Neter and Bender [1] and numerous other investigators have considered *P. morgani* a cause of infantile enteritis, though many authorities doubt its pathogenicity. *P. morgani* seemed to be related to the admission of 4 cases of enteritis with no other demonstrable pathogen present to account for the disease. During the six months there were 11 cases of enteritis apparently acquired in the ward, and in 9 of them *P. morgani* was the only organism of possible pathogenicity found.

The spread of hospital infection by ward dust was discussed by Allison and Brown [2] particularly in relation to *Streptococcus pyogenes*, and by Crosbie and Wright [3] to diphtheria. Our findings suggest that *P. morgani* may be dust-spread. This applies especially to case 5 which was admitted with an infection of the skin, though the possibility—unfortunately overlooked at the time—that the infection came from the patient's own fæces has to be admitted. The organism seems to gain entrance to the dust by soiled bedclothes and clothing. It may be of interest to record that at a late stage of our investigation we examined 10 houseflies caught in the vicinity of a case of enteritis with *P. morgani* in the stools, and that 8 of them were found to be carriers of the infection on both their bodies and legs.

It is not our purpose to offer proof of the pathogenicity of *P. morgani*; rather we have used it to trace the spread of organisms derived from the intestine. Any technique adopted to prevent cross-infection in an

1. Neter, E. and Bender, N. C. *J. Pediat.* 1941, **19**, 53.
2. Allison, V. D. and Brown, W. A. *J. Hyg., Camb.* 1935, **35**, 283.
3. Crosbie, W. E. and Wright, H. D. *Lancet*, 1941, **i**, 656.

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infants' ward should take into account the likelihood that clothing and dust will carry organisms derived from the alimentary tract.

Our thanks are due to Miss M. David, SRN, sister in charge of the children's ward, for her help and coöperation during this work.

NUTRITIVE VALUE OF THE NITROGENOUS SUBSTANCES IN THE POTATO

AS MEASURED BY THEIR CAPACITY TO SUPPORT GROWTH IN YOUNG RATS

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MARGERY E. M. CUTTING, PH D LOND

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THE advisability of substituting potatoes for a proportion of the wheat consumed in this country, thus saving shipping for our war effort, led this Division in 1941 to the reinvestigation of some of the relative values of these two staple foods. On a dry-weight basis* there is little difference between the calorific values; but, whereas bread contains 33% of moisture, potatoes, as commonly eaten, contain 75%, so that more than 2½ times the bulk of the latter is required to furnish the same amount of energy.

As a source of vitamins potatoes are superior to wheat. Their content of vitamin B_1, riboflavin and nicotinic acid is of the same order; but, whereas wheat is devoid of vitamin C, potatoes are an important source. The potato has been the poor man's protection against scurvy, as witness the outbreaks which followed the potato famine in Ireland in 1847 and the shortages in Norway in 1904 and 1912 and in the United States in 1916 (see Hess 1920). There are only traces of fat in the potato, which does not therefore supply fat-soluble vitamins.

The potato contains about half the amount of nitrogen present in wheat and about one-third to one-quarter the amount of protein. The value of a food as a source of nitrogen for the body's needs does not, however, depend only upon the protein it contains, for the latter is broken down in the intestine and from the constituent amino-acids the body rebuilds its own proteins. Accordingly, if the foodstuff contains amino-acids in addition to proteins, these have to be taken into account. The potato differs from the cereals in having about half of its nitrogenous substances in the simpler forms of amides, amino-acids and purines.

The distribution of the nitrogen in different varieties of potato and at different ages was studied by Neuberger and Sanger (1942). Their results are expressed as protein N, amide N (asparagine and glutamine), α-amino-acid N and basic N (purine and cholines). Among the 10 varieties studied the percentage of the total N present in protein ranged from 28 to 51 and that in the remaining nitrogenous compounds from 49 to 72.

During the last sixty years many observers (Rubner 1879, Hindhede 1913, Abderhalden et al. 1915, Rose and Cooper 1917, Rubner and Thomas 1918, Kon 1928, Kon and Klein 1928) have demonstrated that, weight for weight, the nitrogen of the potato was at least as efficient as the nitrogen of wheat for the maintenance of nitrogenous equilibrium in adult man and animals, although only about half the nitrogen is there as protein, compared with 95% in wheat. The results of these trials have proved that the nitrogenous requirements of the adult can in part be met by the non-protein nitrogen.

There is, however, less satisfactory evidence of the value of the mixture of nitrogenous substances in the potato for support of growth in the young animal (McCollum et al. 1918, 1921, Hartwell 1927). The large proportion of starch in the tuber would necessitate the consumption of an impossible bulk in order to obtain enough nitrogenous matter for the optimum requirements of growth.

In the following experiments the value of the mixture of nitrogenous compounds in the potato for support of growth of young rats from the time of weaning is compared with those of wheat and of milk.

* In the present paper all comparisons are based on dry weight.

Experiments

Potatoes of high nitrogen content were chosen, the tests being made chiefly with the King Edward variety grown on fenlands near Cambridge. These contained from 1·8 to 2·0% N (reckoned on the dry weight). Analyses made by the method of Neuberger and Sanger showed this to be distributed as follows: true protein 38, amide 22, amino-acid 10 and basic N 25, per cent. In some experiments the protein separated from the expressed juice was used as source of nitrogen, in others the protein-free juice, and in others the whole potato. In the last case the diets were compounded to contain as much fresh or dried whole potato as possible, supplemented with a little fat, salt mixture and cod-liver oil to provide vitamins A and D. A protein-free concentrate from yeast extract, sufficient to supply adequate amounts of B vitamins, was given separately to each rat. Comparison was made of the performance of litter-mates receiving diets containing a similar proportion of nitrogen from wheat or milk. The amount of nitrogen in the diet was suboptimal so that growth was limited in all cases. All diets were fed ad libitum.

The rats were caged separately and fæces and the unconsumed food were collected on sheets of filter-paper placed underneath the open-meshed floors of the cages. The intake of dried food for all rats in one group was measured together, as well as the dry weight of the fæces passed and their nitrogen content. Further details of the technique used were given in a previous paper (Chick 1942).

EXPT. 1. *Nutritive value of the non-protein nitrogenous compounds in the expressed juice.*—After removal of the protein by heat coagulation, the juice was concentrated in vacuo and added to a mixture of pure starch, arachis oil, salt mixture and cod-liver oil to yield a diet similar in composition and calorie value to the others employed.

After one week on this diet, which contained 1·3% N (on dry weight), the average body-weight of 5 recently weaned rats of initial average weight 44 g. was reduced to 39 g. During the following week, in which the nitrogen was increased to 2·3%, the average body-weight remained at 39 g. By this time one animal was moribund. To induce growth in the others it was found necessary to replace at least one-third to one-quarter of the non-protein N by protein N. When the reverse change was later made to a diet of equal nitrogen content (1·7%) derived entirely from the protein-free juice, there was no further increase, but an immediate decline in weight.

EXPT. 2. *Comparison of diets, each containing 1·6 to 1·8% N, derived respectively from fresh potato, potato dried at 40° C. and whole wheat flour.*—In preparation of the wheat diet about 20% of pure maize starch (of N content = 0·03%) was added to the wholemeal flour to reduce the nitrogen content to that of the potato diet.

The rats receiving the potato diets outstripped those receiving wheatmeal (see fig. 1) although the latter were receiving a slightly higher proportion of nitrogen in their food. In the table are summarised the results obtained during the first 6 weeks of the trial, when growth was most rapid and the need for nitrogen greatest. The rats on the potato diets ate rather more food, but not more nitrogen, and they made better use of it,

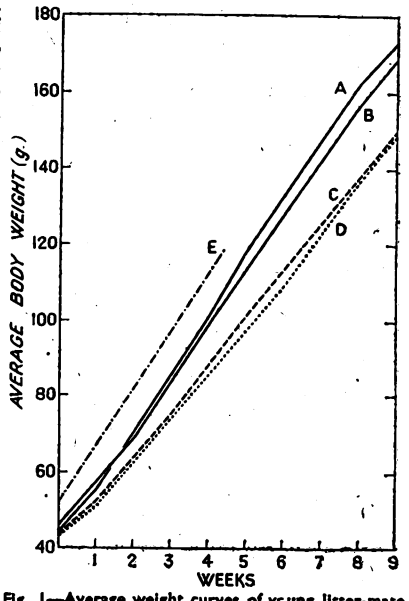

Fig. 1—Average weight curves of young litter-mate rats in expt. 2 receiving diets containing 1·7% nitrogen from: (A) fresh potatoes; (B) dried potatoes; (C) whole wheatmeal; (D) whole wheatmeal with trisodium citrate added to produce an alkaline ash; (E) casein, for reference, taken from expt. 4.

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EXPT. 2—AVERAGE VALUES PER RAT OVER PERIOD OF 42 DAYS
(all figures calculated on dry weight)

Diet	N content (%)	No. of rats	Dry food eaten (g.)	N eaten (g.)	Body-weight init. (g.)	Body-weight final (g.)	Fæces Dry weight (g.)	Fæces N content (%)	Fæces Total N (g.)	Food N digested (apparent) (g.)	Coeff. of digestibility of N (%)	g. wt. increase per g. N eaten
Fresh potato	1·63	5	457	7·38	43·6	133	33·7	5·33	1·80	5·58	75·6	12·6
Dried potato	1·64	4	441	7·16	45·0	130	33·5	5·20	1·74	5·42	75·7	11·6
Whole wheat flour	1·84	5	417	7·66	43·2	113	36·5	3·54	1·29	6·37	83·1	10·0
Whole wheat flour + 3% tri-sod. cit.	1·76	5	397	7·04	42·8	109	32·4	3·62	1·18	5·86	83·2	9·7

EXPT. 4—AVERAGE VALUES PER RAT OVER PERIOD OF 27 DAYS

Protein in diet		*Protein %*										
Tuberin	1·46	9·1†	2	175	2·55	53	78	12·1	8·72	1·05	1·50	58·7	9·8
Whole wheat	1·91	10·9‡	2	195	3·73	51	80·5	20·3	3·37	3·05	3·05	81·7	7·9
Casein *	1·70	10·6†	2	221	3·74	52	110·0	9·1	6·27	3·17	3·17	84·8	15·5

* Glaxo ashless extracted. † N × 6·25. ‡ N × 5·7.

achieving about 12 g. weight increase per g. N eaten, as compared with about 10 g. in the case of the wheatmeal diet.

There was no significant difference between the value of the fresh and dried potato.

Digestibility of potato and wheat nitrogen.—The fæces passed from rats eating potato had a higher nitrogen content—about 5·3% as compared with about 3·6% in the fæces from rats eating wheatmeal. The coefficient of (apparent) digestibility of the nitrogenous matter in the potato was 76 and that for wheat, 83.

EFFECT OF THE DIFFERENT ACID-BASE BALANCE IN POTATO AND WHEAT DIETS

The high value of the potato nitrogen in maintaining equilibrium in adults has been attributed by Berg (1920) to the alkaline nature of its ash. This property, it is considered, may effect an economy in the utilisation of nitrogenous substances in the organism by avoiding the diversion of N to form ammonia to neutralise the mineral acids produced by oxidation of organic compounds of sulphur and phosphorus ingested in the food (see also McCollum and Hoagland 1913). Wheat and other cereals yield an acid ash, as their content of organic phosphates and sulphur is not balanced by salts of fixed bases with organic acids. In one series of the tests enough trisodium citrate was therefore added to the wheatmeal diet to produce an ash of alkalinity equal to that of the potato diet. As will be seen from the results of expt. 1 in the table, this alteration had no significant effect on the utilisation of the wheat nitrogen.

EXPT. 3. *Comparison of the value of the nitrogen of the potato with that of skim milk.*—Diets were arranged to contain 1·2 to 1·35% nitrogen, derived respectively from dried potatoes and the dried "household" skim-milk at present on the market.

The growth of rats receiving the potato diet was inferior. The nitrogen in the diet was therefore raised to 1·8% by incorporating in the diet a concentrate of potato juice made by evaporation in vacuo at low temperature. The performance of the rats was then equal to those receiving the milk diet containing 1·35% N, the average weight increases over a 5 weeks' period being 43 and 48 g. respectively. The milk nitrogen was more economically used, however, the average g. wt. increase per g. N. ingested being 10·5, while the figure for potato nitrogen was 8·0.

EXPT. 4. *Comparison between the proteins of wheat and casein and the protein of potato juice.*—This potato protein, called tuberin by Osborne and Campbell (1896), was separated by heat coagulation followed by sedimentation, centrifuging, washing with water and with 85% alcohol to remove solanin, and drying (see Kon 1928).

Diets were composed, to contain about 10% protein, from whole wheat, casein and potato. The rats receiving the potato protein "did" better than those on the wheat diet, although the proportion of protein in the diet was rather lower and the digestibility of the nitrogen much lower, the coefficients being respectively 59 and 82. The weight increase over a 4 weeks' period was similar in the two cases, but, related to the nitrogen intake, the advantage was with the potato protein, the increase per g. of nitrogen intake being 10·2 and in the case of the wheat protein 7·9 (see expt. 4 in the table and fig. 2).

With casein the weight increase over a corresponding period was greater and the digestibility of the N higher (coefficient 85); the g. wt. increase per g. N ingested, 15·5, was nearly twice that of wheat protein. In the experiments of Kon (1928) the value of tuberin for *maintenance* of weight in young rats was found to be about equal to that of casein.

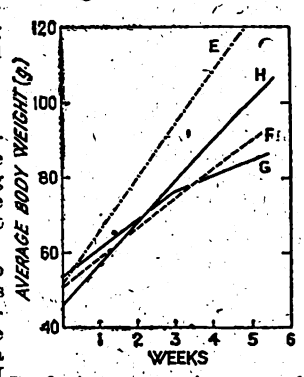

Fig. 2—Average growth curves of young rats in expt. 3 receiving diets containing 1·4–1·8% nitrogen from: (E) casein, 1·7% N; (F) whole wheatmeal, 1·8% N; (G) tuberin, 1·45% N; (H) tuberin, 1·7% N is included although the rats were not litter-mates with the above.

REPRODUCTION

A group of rats were maintained on the potato and the wheatmeal diets containing about 1·7% N until they were adult. Mating took place at 4–5 months of age.

Of 7 females on the potato diet, 6 produced living litters containing 7–10 young. Lactation failed, however, and none were reared. Addition of extra potato protein to raise the N content of the diet of 3 mothers during gestation to about 2·4% had no effect.

Of 4 female rats consuming the corresponding wheatmeal diets, 3 produced litters containing 8–14 young. In two cases the young, reduced in number to 5 and 6 respectively, were reared; they developed very slowly and were much under weight. In one case extra wheat and less starch was given in the diet during gestation and lactation, to make the nitrogen content about 2·5%.

The proportion of nitrogen in all the above diets was far below that usually considered necessary for rearing young mammals.

Discussion

The results of these experiments show that for support of growth in young rats from weaning onwards, as has already been shown for maintenance, the mixture of nitrogenous substances in the potato has a value as high as that of wheat protein. This unexpectedly high value cannot be explained in terms of the protein fraction alone, roughly 40% of the total. If it were attributable to protein alone, potato protein would possess nearly three times the nutritive value of wheat proteins and about twice that of the mixed proteins of milk, which have as high a biological value as those of any known foodstuff. The absurdity of such a conclusion is emphasised by the results of expt. 4. Kon (1928) when

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comparing the results of his tests with tuberin for maintenance of nitrogen equilibrium in rats, with those of Mitchell (1924) who used the whole nitrogen of the potato, concluded that "the non-protein nitrogenous constituents of the potato are well utilised by the rat for repair of the body tissues."

Our experiments indicate further that, although the non-protein constituents alone were incapable of supporting growth, addition of them to the amino-acids set free by digestion of the protein, in the proportion of about 6 parts to 4, afforded 10 parts of a nitrogenous mixture which, weight for weight, was of about equal value for growth to that of the protein (tuberin) itself. Some 20% of the non-protein N is asparagine and glutamine (Neuberger and Sanger) and neither aspartic nor glutamic acid are indispensable amino-acids. Of the other amino-acids contained in the non-protein fraction nothing is known beyond statements by various experimenters that they have discovered in it phenylalanine, lysine, histidine, arginine, leucine and tyrosine. This fraction is, however, evidently deficient in some of the 10 known indispensable amino-acids (see Rose 1938) and this deficiency appears to be met by a superabundance of these particular "building stones" in the potato protein. Coincidentally, an excess of one or more essential amino-acids in the non-protein fraction may compensate for a weakness in the protein and so increase its biological value. The nutritive value of the mixture of nitrogenous substances in the potato thus far exceeds that of the true protein it contains and reaches a quality at least equal to that of the proteins of wheat.

Summary

1. The value of the nitrogenous substances in the potato for supporting growth of young rats was found somewhat greater than that of those in whole wheat, although the (apparent) digestibility of the potato nitrogen was lower and only about 40% of it was protein, whereas over 90% of wheat nitrogen is in this form. Addition of sodium citrate to the wheat diet in amount sufficient to make the alkalinity of its ash equal to that of the potato was without effect.

2. The nitrogenous substances of potato were found inferior in nutritive value to those of milk, which showed a superiority to the extent of about 20%.

3. A diet containing 9% of tuberin, the soluble protein in potato juice, was equal in value to one containing 11% whole wheat protein, but not equal to one containing 11% casein.

4. The drying of potatoes at a low temperature by the method here employed did not alter the nutritive value of the nitrogen or its digestibility.

5. The results summarised above can only be explained by assuming that some portion of the non-protein nitrogenous substances in the potato complement the amino-acids of its protein to produce a mixture of biological value not less than that of the protein itself.

We wish to thank Sir Charles Martin, not only for the hospitality given to this Division of Nutrition at Roebuck House, Cambridge, since the outbreak of war, but also for his continued interest and help in this work. We are grateful to the Department of Agriculture of Cambridge University and to the Molteno Institute for allowing us to use some of their equipment. We acknowledge the assistance of the Research Association of British Flour Millers in providing the samples of whole wheat flour used; of Mr. Jackson of Messrs. England and Sons, Ely, in obtaining suitable potatoes; of Messrs. Mackean, Ltd., Paisley and of Messrs. Greene King and Co., Cambridge, for supplying, respectively, the pure maize starch and the yeast from which the yeast extract was prepared. Our thanks are also due to Mr. J. S. D. Bacon, M.A., who collaborated in expts. 3 and 4, and to Mr. G. W. Flynn for assistance in the care of the animals.

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Medical Societies

BRITISH ORTHOPÆDIC ASSOCIATION

THE annual meeting was held in London on Oct. 29 and 30, under the presidency of Mr. G. R. GIRDLESTONE (Oxford), whose address was reprinted in the *Lancet* of Nov. 13. It was announced that negotiations between the Royal College of Surgeons and the association were well advanced by which it was planned to establish the official headquarters of the association in premises of the college at Lincoln's Inn Fields. The advantage to British surgeons of the integration of this and other special branches of surgical science within the domain of the parent body was not least of the many desirable features of such an arrangement. It was also announced that a joint examining board for orthopædic nurses had been formed with the Central Council for the Care of Cripples. The joint advisory committee of the association and the British Empire Rheumatism Council had submitted to the Minister of Health a memorandum dealing with the future services for the treatment of chronic rheumatism and the coöperation envisaged between orthopædic surgeons and physicians specialising in rheumatology.

TRAINING, RESETTLEMENT, REHABILITATION

Mr. G. GOMME (Ministry of Labour) outlined the development of the Ministry's interim scheme for training and resettlement of the disabled, influenced as it had been by the report of the Tomlinson Committee which had been accepted by the Government, the trade unions and the employers. Some broad conclusions had been reached as the result of two years' work. The arrangements for interviews with disabled workmen while in hospital (100,000 such have been completed) have proved successful. Broadly speaking, physical disability is not such a serious barrier to employment as had previously been thought. Although 70% of the disabled interviewed were back at work, it is open to question whether many of the war-time jobs arranged are suitable as permanent resettlement. The scheme has not yet been able to cope with that not inconsiderable group who for various reasons (usually psychological, but also general unfitness) are unemployable. It was apparent that the problem of resettlement can be solved far beyond expectations. With the greater information available under the Tomlinson scheme it was possible to develop a really satisfactory addition to our social services.

Mr. W. GISSANE (Birmingham), in describing the Birmingham experiment in accident treatment emphasised its aim to provide a central hospital with entire control of hospital treatment together with the other auxiliary services which will achieve complete rehabilitation of the injured workman either to his pre-accident job or until he is fit to combine his necessary treatment with productive work. For the latter the man is handed on to "rehabilitation shops," of which it is hoped to provide a series to cover Birmingham. The work of one of these was described in a motion picture. There the hospital surgeon was concerned with planning jobs and progress in movements, power and duration of work. In the team was also the factory doctor and the shop manager, who was invaluable as an understanding technician in the planning and construction of apparatus and machinery—in taking the training out of the "arty and crafty" sphere so common in hospital, and in making the work suitable for the more important activity of the factory in which the workman was expected to earn his livelihood. The main job at this place is industry's

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responsibility. The final stage is the direct transfer of the workman out of these shops back to the factory proper. The cycle of treatment is then completed.

Major FRANK STINCHFIELD (USAMC), with a motion picture prepared under the direction of Colonel R. L. Diveley, who was elected an honorary member of the association at this meeting, described the methods employed in the US Army for the rehabilitation of the sick or injured soldier. The film illustrated the work of a special reconditioning centre established in Great Britain, the purpose of which was to graduate physical and mental re-education and training through gymnastics, physiotherapy, sport and field-work with an enlightened discipline and enterprise.

SHORT PAPERS

Major RALPH SOTO-HALL (USAMC) discussed *Lesions of the Articular Cartilage of the Patella*, which were found to have a high incidence scarcely noted in the Anglo-American literature. Fractures in the cartilage of the patella without bone involvement are common and as a delayed manifestation is *chondromalacia patellæ*. This was believed to be a form of aseptic necrosis and appeared as degeneration of the cartilage matrix. Many patients have little disability if the area involved is small. Of the operations, partial resection of abnormal cartilage, total resection of the articular surface, and patellectomy, the first was only useful in small lesions, the second was unsatisfactory, but the third gave good results. Major Soto-Hall had done it in five cases; four with good or excellent results, the remaining one not improved. In patellectomy care must be taken to restore proper tension in the quadriceps expansion by overlapping the tendon.

Major R. A. PATTERSON (USAMC) reported that in *Fractures of the Upper End of the Tibia involving the Knee-joint* excellent results can be obtained by conservative methods: aspiration of the hæmarthrosis, reduction by compression or manipulation, and the institution of early motion, the next day passively and at about five days actively, in a Thomas splint with a Pearson attachment and traction. The improved control obtained by the incorporation of the patient's thigh and the upper part of the splint in plaster-of-paris was among the points demonstrated in a motion picture. Major Patterson emphasised that in the army one must use a treatment that is easy, applicable to all surgeons, and will return a man to duty as a soldier in the shortest time.

Wing-Commander W. D. COLTART (RAF) reviewed a series of *Injuries of the Astragalus*, which were to be regarded as having an incidence peculiar to the crashes of air-crews. He urged the importance of complete reduction of the subastragaloid dislocation or subluxation which occurs in so many fractures of the neck of the talus. It is secured by plantar flexion but the displacement may recur when this position is relieved at the end of the first month. Posterior dislocation of the body is a surgical emergency, and it was of the utmost importance to reduce it at once. The body should be preserved when possible, even when in late cases avascular necrosis is present, for arthrodesis will give better results than astragalectomy, preserving the height of the foot and the leverage of the forefoot. If the whole bone or the body is irretrievable a second-stage fusion of the tibia to the os calcis should be planned rather than accept astragalectomy as a final result. While deformity of the body following avascular necrosis rendered fusion inevitable it had to be remembered that mere radiographic opacity without deformity could resolve, if immobilisation of the contiguous joints had been begun before opacity appeared and was continued long enough for regeneration to occur (this might take as long as 37 weeks). In all fractures and dislocations of the astragalus the emergency treatment was of the utmost importance.

Mr. ST.J. D. BUXTON (London) discussed *Gunshot Wounds of the Elbow-joint* in a paper published elsewhere in this issue.

Mr. R. WATSON-JONES (Liverpool) described his recent journey with other surgeons to Russia (see *Lancet*, Aug. 14, 1943, p. 198), telling of life, work, and recreation in this war-riven country, of the plodding workers, the courage of the soldiers, both men and women, the resource and energy of its doctors and nurses, and of the frightful difficulties so successfully overcome. A journey to the front line took the visitors through a pleasant, fertile countryside surrounding many blasted and ruined cities to tented hospitals and others constructed by nurses themselves in the midst of forest pines during quiet periods. They were impressed by the skilful organisation of casualty reception and clearance to well-equipped wards, in many of which beds were arranged in tiers. Present-day Russian medical service was a remarkable achievement, having grown from practically nothing 25 years ago when there were only thirteen medical faculties for a tenth of the world's population. Now the aim was to graduate 25,000 doctors a year. Russia, changing month by month and becoming more westernised, was on the verge of great things. The visitors had made many friends among the surgeons and nurses of Russia; the Russians as a whole were easy to make friends with and worth understanding.

Prof. H. J. SEDDON (Oxford) gave an account of a recent epidemic of *Poliomyelitis in Malta* (see *Lancet*, Oct. 30, 1943, p. 549). In the second half of 1942 affairs in Malta reached a crisis. Not only had the island been subjected to the most devastating bombing but there was such a shortage of food that the population, both civil and military, were feeling the effects seriously. In the middle of November there was an outbreak of poliomyelitis, beginning in the civilian population and affecting some 400 persons, almost entirely children under five. Two weeks later there was an outbreak among Service personnel, with a total of 60 cases. Investigation showed that the virus was almost certainly a native one. There was virtually complete immunity of the adult Maltese population and a comparative absence of immunity among non-native troops. Furthermore, the mortality among the troops was nearly five times as great as that among civilians. There was no convincing evidence that overcrowding had anything to do with the outbreak. Indeed, overcrowding had passed its peak, and the number of contact cases was remarkably small. Malnutrition could not be blamed either, for in the neighbouring island of Gozo, where the food-supply was almost normal throughout, the incidence of the disease was much the same as in the main island. Owing to the great shortage of fertilizers permission was given in July to use raw sewage on farms—there was no other way of bringing vitally necessary crops to maturity. This measure was followed by an outbreak of typhoid fever, *before* the crops being fertilised had been gathered. The devastation in the densely populated parts of the island encouraged the breeding of flies and it is possible that the typhoid was fly-borne. The epidemic of poliomyelitis may also have been spread in the same way, but it was also possible that it had come from contamination of the water-supply with sewage. The chlorination, which was adequate for controlling contamination of the water with organisms of the enteric group, was inadequate for destroying the virus. Unfortunately, it was not possible to carry out any inoculation experiments, and the presence of the virus in the water-supply remains conjectural. In the majority of cases, the lumbar and sacral segments of the cord were much more severely affected than were other levels, and there is little doubt that the portal of entry was mainly alimentary.

ROYAL SOCIETY OF MEDICINE

IN a presidential address to the section of proctology on Nov. 10, Dr. CUTHBERT DUKES analysed the results of treatment of more than 1000 patients with

Cancer of the Rectum

In the absence of lymphatic metastases, he said, the position of the tumour in the rectum has little influence in prognosis after excision, but in cases with glandular spread the survival-rates are slightly better for tumours of the upper and lower thirds than for the ampulla. The size of the growth is no indication of the extent of spread, but deep ulceration is usually a sign of deep penetration. Rectal cancer rarely spreads upwards within the bowel wall for more than a short distance above the visible margin of the growth.

Signs of intravenous spread have been found in 17% of operation specimens. If the intravascular growth is firmly fixed and limited to the outer margin of the primary tumour it has about the same prognostic signi-

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ficance as an isolated lymphatic metastasis, but if it is massive and associated with loose clots, emboli are almost certain to have passed to the liver. Patients with one to three lymphatic metastases often survive 5 years, but this 5th anniversary is rarely reached by patients with four or five. The position of lymphatic metastases is of even greater importance than the number. A survey of the extent of local and lymphatic spread in a large series of cases treated by a combined operation has shown that about half of these might have stood as good a chance of cure if a perineal excision had been done instead. In the other half the combined operation probably gave a better chance.

After surgical treatment most recurrences are manifest within 3 years, and it is very rare for a patient who has passed the 5th anniversary of his operation to die of rectal cancer. Judged on 5-year survival, it seems that the surgical treatment given to these patients cured about half. After removal of the rectum for cancer, patients who survive 5 years now have as good an expectation of life as a control non-cancer population still possessing a rectum. More than 80% of A cases (growth limited to rectum) are cured by operation, and more than 60% of B cases (spread to perirectal fat but no glandular metastases); but unfortunately at present less than half the patients are operated on at these stages, and once lymphatic spread has commenced (C cases) the prospects of surgical cure rapidly decline. The disease is commoner in men than in women, but at the time of treatment it is generally more advanced in women than in men. After operation the survival curves follow a similar course for 3–4 years, after which there are more female survivors than male. For cases without lymphatic metastases the survival-rate is practically the same irrespective of the type of operation, but for those with lymphatic metastases the results of the combined operation (including abdomino-perineal, perineo-abdominal, and synchronous combined) show an improvement of 13% on the perineal. Recent improvements in surgical technique may bring this credit balance up to 15% or 20%.

In the period covered by this review, said Dr. Dukes, the treatment of rectal cancer by rectal surgeons reached a level never before attained; but the results of surgical treatment generally throughout the country might be further improved. One obvious way is for the special hospitals to provide more facilities for postgraduate study and the sharing of experience. The other is to make it better known that in its early stages rectal cancer can be completely cured, and that even in more advanced cases surgical treatment is often satisfactory. The chief need of the day is earlier diagnosis and the best means of ensuring this is to awaken more interest in the disease and more confidence in the possibility of cure.

MEDICAL SOCIETY OF LONDON

AT a meeting on Nov. 8, with Prof. G. GREY TURNER, the president, in the chair, Prof. H. J. SEDDON spoke on

Surgery of the Nerve Gap

The power of the central end of a severed nerve to put out axons, he said, remains unimpaired for a very long time. When the ends of a severed nerve are brought together regeneration depends not only on this power but on the formation of a conducting bridge of Schwann cells which grow for the most part from the peripheral stump. Nerve-fibres cannot attain maturity unless they find their way into the Schwann tubes of the peripheral stump. The proliferative activity of the Schwann cells reaches a maximum at the twenty-fifth day and then declines fairly rapidly, though there is still some power of growth after a year. The outgrowing axons may encounter other troubles; the Schwann columns in the peripheral stump shrink progressively, so that many fibres may remain unmyelinated, and incapable of proper functioning. Degenerative changes in motor and sensory end-organs are largely reversible in the early stages but long delay is harmful, especially to motor endings. He believes that primary suture is less satisfactory than early secondary suture, and therefore inadvisable; but every effort should be made to get the injured limb into such a condition that the nerve can be repaired within a few months or weeks of injury.

In end-to-end suture the surgeon must, he said, mobilise the nerve before performing any kind of resection. The central and peripheral stumps must be freed as far as is anatomically possible; most of the collateral nutrient vessels have to be divided, but the longitudinal supply is so good that this is rarely harmful. The gain from freeing the central and peripheral stumps is only about 3 cm., but is essential for what follows. Flexing of a neighbouring joint usually allows so much approximation of stumps that considerable gaps can be closed. One stump may be tethered down by branches, but every branch is bound to the main trunk only by epineurium and perineurium for several centimetres above the point at which it appears to leave it, and it is possible to gain considerable mobility by stripping the branches back to their real point of origin. This is done with a very sharp-pointed knife, and must stop instantly the moment the point of fusion of the branch with the main trunk is reached. If stripping does not give the necessary mobility the surgeon must decide whether he is justified in sacrificing one or more branches. He has to balance what he will lose against what he will gain, but the distal parts supplied by a main trunk are on the whole more important than the proximal parts. Thus sacrifice of the branch to the brachioradialis in a lesion of the radial nerve just above the elbow is always justifiable if it allows good apposition of the cut ends. Transposition of the ulnar nerve gives a useful increase in length. Very large gaps have sometimes been closed by suturing the nerve with a joint in a position of extreme flexion.

In the early days of this work, Prof. Seddon said, he and (the lamented) Highet had tried to outdo each other in the closure of large gaps by this method, and Highet had won by closing a gap of 17 cm. in the external popliteal; but when they came to survey results they found that the nerves had not regenerated. Thus the biological limit to success is stricter than the anatomical one. Postoperative stretching, in these cases, produced a traction lesion of far greater extent and severity than that for which resection and suture were originally performed. This point is more important in the lower than in the upper limb, for the patient must be able to extend his knee fully if he is to walk properly; postoperative stretching is therefore maximal. In the upper limb, at the elbow, some compromise is possible, and postoperative stretching can be cut short at 30°–45° of flexion—a position of useful function in the upper limb. Bulb-suture is sometimes used when the nerve ends are too far apart for resection and suture after full mobilisation. The ends are overlapped without resection and stitched together firmly, and postoperative stretching is begun immediately and usually completed in three weeks. He had used the method in 5 cases, with 1 success and 2 failures; in 2 cases it was still too early to expect recovery. Bone shortening, he said, has been condemned as unjustifiable by Jocelyn Swan, but in cases of ununited fracture of the humerus with division of the radial nerve it is permissible. The problem presented by the nerve gap is serious. In the Oxford series there were 200 sutures, and 61 cases in which no form of direct repair was possible. Of the 61, only 27 had been dealt with by extraordinary surgical measures. There were 5 bulb sutures, 2 bone shortenings with nerve suture, 16 autografts and 4 homografts. In many of the 200 sutures the gaps that had to be closed were considerable and it is now certain that the prospect of recovery was spoiled by excessive postoperative stretching. Hence, about a third of all cases of nerve division require treatment by some means other than direct end-to-end suture.

Speaking of grafting, he said that since it is necessary to close a gap in a nerve by providing a scaffold of Schwann cells, all forms of treated graft are useless. The histological findings when such a graft has been used are no different from those seen when the axons have tried to bridge a large gap for which no kind of repair has been attempted. In rabbits, short autografts of small diameter have been as successful as the results of primary suture. In man digital and facial nerve autografts have given good results. All grafts shrink, and should therefore be on the long side, or they pull away at one point of union. In 6 cases of digital grafting he had had 3 failures because resection of the

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peripheral stumps had been inadequate. Cable grafts have a limited application because no patient has enough cutaneous nerves to spare to make up a really long thick cable. He had used it in 6 cases with one good and one poor recovery and 2 failures; in the remaining 2 it was still too soon to expect return of function. In a patient with two serious nerve lesions, one of which is beyond hope of repair, it is sometimes possible to use an autograft from the irreparable trunk to bridge a large gap in the other. Heterografting is useless. Small homografts have been successful in rabbits, but in man he had had no success in 4 cases. The body treated the grafts as foreign material. Medawar has shown, he said, that skin homografts, after growing vigorously for a few weeks, melt away and disappear; and a second set of homografts, transplanted from the same donor while this reaction is at its height, disappears immediately. This evidence of the development of specific antibodies to the graft probably applies also to nerve tissue—which, like skin, is epiblastic. In the rabbit fibres can probably cross a small homograft before the antibodies develop and disrupt the graft. But in man the development of immunity probably wins the race against the growing axons, and destroys the graft before they can bridge the gap.

To sum up: end-to-end suture is still the best form of repair for a divided nerve; mobilisation to bring together widely separated stumps has a biological limit which is stricter than the anatomical one; the ideal bridge is some sort of graft and autografts work perfectly experimentally and after a little more work may prove extremely useful in man; homografts are not promising; and heterografts and all preserved grafts are useless.

DISCUSSION

In the discussion which followed Major-General D. C. MONRO asked whether nerves should be sutured by surgeons working near the front line, in the occasional case where the wound was a clean cut and likely to heal by first intention. He said that he had been unimpressed with results of nerve-grafting in Russia.—Brigadier W. R. BRISTOW considered that no cases ought to be treated at any hospital in front of the base, and that nearly all cases of nerve injury should be sent home. Under service conditions there are neither facilities nor time for this intricate kind of surgery. The most that the front-line surgeon should do is to anchor together the ends of a divided nerve, which probably makes the task of the surgeon carrying out secondary repair somewhat easier.—Sir JAMES WALTON recalled that eight years ago, in Paris, he had seen nerve gaps bridged with preserved spinal cord taken from the rabbit; it was claimed that functional recovery occurred as early as three weeks; but he had felt sceptical.

The CHAIRMAN asked whether there was any special merit, as Ballance had claimed, in predegenerate autografts. He thought Prof. Seddon a little impatient in condemning as hopeless the failures after resection and suture for large gaps. In some cases of suture recovery has been seen as late as ten years after operative repair, and it may well be that rates of regeneration regarded as normal are inapplicable in complicated cases.—Prof. SEDDON replied that late recovery might perhaps occur, not because the regeneration in the nerve itself was slow, but because of very slow improvement at the periphery, especially in muscles. Predegenerate grafts were superior to fresh grafts in only one respect: they were easier to handle.

Reviews of Books

Cirugia Plastica

LELIO ZENO, professor of surgery in the Rosario Medical Faculty. (El Ateneo, Buenos Aires. Pp. 337).

WHEN a surgeon employs a scientific approach to a book on surgical technique he is compelled first to outline his personal medical beliefs before proceeding to detailed descriptions of procedure. In his firm adherence to the Hippocratic tradition and to its modern scientific version, especially the physiological school of Claude Bernard, Dr. Zeno belongs to that generation which is trying to raise surgery from a purely manual art to a science, or at least to give mere "art" a secondary place and to insist on the prime importance of scientific principles. He brings out these points clearly in his book. The first section is devoted to a description of wounds, burns, infections, scars and grafts, and deals with the use of inert substances in plastic reconstruction. He gives almost colloquially the results of his personal experience, at the same time discussing and analysing many surgical problems; the lesion and its treatment are always placed together. In the treatment of burns, he recommends the use of plaster-of-paris and puts forward his claim to have originated the use of plaster for this condition. In skin grafting he is a follower of Gillies; he also describes bone and other grafts. The second section deals with the surgical technique of the various regions of the body; it is well illustrated with photographs of cases and is probably the best part of the book. The third section is by Dr. E. Pizarro Crespo, the psychiatrist. He discusses the psychological and social aspects of injury, mutilation and reconstruction. Taken as a whole, this book is one of the best contributions to the surgery of repair which has come from this notable surgical school of the Argentine.

Modern Treatment Year Book 1943

Editor: CECIL P. G. WAKELEY, D SC LOND, FRCS. (Baillière for *Medical Press and Circular*. Pp. 260. 12*s*. 6*d*.)

WHERE year books are concerned, the general practitioner seems to be as nebulous a person as is the "intelligent layman" to the writer of popular scientific works. The term "modern," too, is apt to be used in a sense which even Einstein might have some difficulty in defining. It is doubtful whether many GPs will be attracted by an article on the technique of the modified Paul-Mikulicz operation for resectable cancers of the right colon, but most of the articles supply information of value, though magnesium sulphate and morphine are both recommended in the treatment of nephritis—a combination liable to have disastrous effects. The outstanding contribution is that of R. C. Wingfield on treatment of pulmonary tuberculosis, a model of concise common sense. Much of the volume is devoted to war medicine and surgery, and the articles in this section are practical and useful. Major-General Mitchiner's introductory paper should be presented to every medical officer on first joining the RAMC; written in his characteristically terse and racy style it could scarcely be bettered.

Handy Case-taking Schemes for the Psychoses and Neuroses

A, SPENCER PATERSON, MD EDIN., FRCPE, Dip. Psych., psychotherapist to the Middlesex Hospital, London. (Lewis. 1*s*.)

MANY doctors will welcome this card of instructions for taking a psychiatric case. It consists of two sheets placed back to back in a transparent envelope, one of them giving the general points which must be covered in the history and mental examination of any patient with mental disturbance, and the other dealing more particularly with the questions that must be borne in mind in examining neurotic patients. Although nothing can compensate for an awareness of what symptoms must be looked for and what hints followed up when the routine questions are being answered, a guide such as this assists the practitioner who was not taught as an undergraduate that there is as detailed a technique for mental as for physical examination. There is a notable omission on the card; a heading should be inserted referring to the patient's war service, whether as a civilian or in the Armed Forces. It should also be made clearer than it is that an examination of the mental state, apart from the history, is as necessary in neurotic subjects as in the insane. The patient's personality and family history is rather unwisely mentioned under the heading "history of present illness," as well as in a separate place. Hypochondriacal traits of personality are important enough to be mentioned specifically. "Sibs" is an unfamiliar word to many doctors: "brothers and sisters" would be preferable. The card will serve a very useful purpose if it induces doctors to investigate their "functional" cases and so come closer to understanding them.

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THE LANCET

LONDON: SATURDAY, NOVEMBER 27, 1943

HOSPITAL DIET

ONE of the shortcomings of medical organisation is the time lag between the proof that a discovery has value and its general adoption. A recent memo[1] published by King Edward's Hospital Fund for London suggests that advances made in nutrition during the last twenty years are no exception to this rule and that in the very section of the community where their truth is most emphatically recognised they are not thoroughly applied. The memo describes an investigation planned to show the nutritive value of representative diets provided for patients and for the nursing staff in three general hospitals of 150–250 beds. The diet selected for analysis was removed in the ward, after it had been served as it would have been handed to the patients, and the helpings were representative. The same procedure was adopted in the nurses' dining-room. The results are disquieting: on the (questionable) assumption that a man of 10 st. requires only 1690 calories daily and a woman of the same weight 1450, hospital Y provided enough food but hospitals X and Z were both deficient by several hundred calories. Hospital X was deficient in protein for men and women and in vitamins A and C, hospital Y was deficient in protein for men and vitamins A and C, and hospital Z in protein for men and women, iron, calcium and vitamin A. Allowing for their strenuous occupation the nurses did not appear to fare much better. Assuming that a nurse requires between 2100 and 2500 calories, the nursing staff at hospital X did not get enough to eat and also went short of vitamin C; at hospitals Y and Z they lacked vitamins A and C, and at hospital Z iron as well.

The results obtained in these three hospitals raise an uneasy suspicion that the same state of affairs exists in many others. To resist and overcome infection and to heal wounds under the best possible conditions a full well-balanced diet is essential and it seems reasonable—particularly for hospital patients and nurses—to err on the side of too much rather than too little. The nursing staff, living strenuously with limited recreation, relatively low pay and constant exposure to infection of all kinds, deserve the best food that medical knowledge and organisation can provide. Dietetic needs are now too clearly defined for deficiencies to be excused on grounds of ignorance. The memo suggests that in the past finance has pressed far more hardly and unfairly on the catering department than on other services of the hospital, such as the dispensary. But food should be regarded as one of the essential remedial services offered by hospitals. The function of a dietetic department of a hospital is discussed, with special reference to organisation, planning of diets, buying, preparation and cooking of food and serving of meals. Bad cooking, monotonous menus or inefficient service may each spoil the value of a meal to the patient. To serve appetising meals day after day to several hundred sick people is a complicated problem, and it is suggested that the dietary in every hospital should be planned by a qualified dietitian working in coöperation with a permanent catering or food service committee, representative of the medical, administrative and executive staff. This plan has been tried successfully at the General Infirmary, Leeds. Improvements in catering do not necessarily lead to a corresponding increase in expenditure, for, as the memo points out, waste may be prevented and organised group-buying may lead to improvement in quality and reduction in cost. In any case expense does not necessarily mean tastiness; many a wholesome diet built up on a scaffolding of calories and international units leaves an unpleasant taste in the memory which can only be effaced by a cheap and dubious dinner in Soho. Tepid rice pudding, or congealed gravy, or the same familiar fish with its coating of salmon-coloured sauce arriving day after day, daunt the stoutest appetite and drive the pale convalescent back to his barley water. It sometimes seems the psychic flow of gastric juice in the stomach of Alexis St. Martin was poured out in vain.

1. Hospital Diet. From the secretary, King Edward's Hospital Fund for London, 10, Old Jewry, London, E.C.2. 6*d*. post free.

SPINA BIFIDA, HYDROCEPHALUS AND OXYCEPHALY

THE surgical treatment of developmental abnormalities of the brain and spinal cord has always been enveloped by gloom, and many would hold that infants with extensive maldevelopments at birth should not be encouraged to live. Those which do survive are a depressing problem for the pædiatrician, neurologist and orthopædist, among others, and not least for the parents, who soon realise that our efforts are poor ones to make the best of a bad job. INGRAHAM and his associates[1] hold that this pessimism is unwarranted. From their study of 546 cases at the Boston Children's Hospital they find that 30% of patients with spina bifida and 34% with encephalocele may expect a relatively normal life. They realise, of course, that good results depend as much on selection of cases as on operative technique; no amount of operating will benefit paralysed limbs and sphincters if the spinal cord has not developed, or if the relevant neural elements are hopelessly entangled in the hernia. These cases are mostly easy to recognise, but with less gross abnormalities the most careful judgment is required to decide whether an operation will simply prolong the life of a hopeless cripple, or will leave a child who can expect a reasonably normal life. The decision may be easier at the end of a year or eighteen months than shortly after birth; neurological abnormalities will then be easier to assess, as will the mental state, and the detection of other serious abnormalities such as hydrocephalus may contra-indicate operation. The indication for operating earlier in life is impending rupture of a thin-walled and imperfectly epithelialised hernia in an otherwise hopeful subject. In later childhood, progressive sensori-motor or sphincteric disturbance, associated with spina bifida, demands operation; in many of these cases the spinal cord or cauda equina is tethered at the site of the vertebral defect, and the elongation of the trunk causes tension by traction which may be relieved by operation. INGRAHAM maintains that

1. Ingraham, F. D. and Swan, H. *New Eng. J. Med.* 1943, **228**, 559; Ingraham, F. D. and Hamlin, H. *Ibid*, p. 631; Ingraham, F. D. and Lowrey, J. J. *Ibid*, p. 745; Ingraham, F. D. and Matson, D. D. *Ibid*, p. 815; Ingraham, F. D. and Scott, H. W. jun. *Ibid*, 1943, **229**, 108.

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hydrocephalus is never caused by repair of a spina bifida, and that in cases in which it seems to develop after operation in early infancy it would have happened anyway. In view of the frequency with which the two abnormalities are associated in untreated subjects this seems reasonable. The operation usually amounts to excision of the hernia, care being taken to preserve all the contained neural elements, except those which obviously end in the sac. No elaborate attempt is made to repair the skeletal defect, but great care must be taken to ensure an accurate and firm skin closure, and this may demand a good deal of ingenuity. Of as much importance are the post-operative nursing measures to lessen the risks of wound infection and leakage of cerebrospinal fluid; the creditably low operative fatality-rate of 15% is a tribute to these measures. The subsequent management may include orthopædic treatment for partial paralyses, and coöperation between the neurosurgeon and orthopædist will produce the best final results.

Infantile hydrocephalus has also been receiving attention from neurosurgeons, and again recent work suggests that this condition is not uniformly hopeless. PUTNAM [2] points out that enlargement of the head in infancy may be due to a subdural collection of highly proteinaceous fluid which is probably the residuum of a hæmatoma and can be dealt with easily and effectively by aspiration. Benign tumours may obstruct the circulation of cerebrospinal fluid, and these may be dealt with by operation. But there is a larger group of cases in which the increased pressure and consequent enlargement of the head are due to more subtle causes which are difficult to demonstrate—in some cases, obstruction to the circulation of the cerebrospinal fluid can be inferred, or demonstrated as in stenosis of the aqueduct of Sylvius; in other cases no such obstruction can be found, and it is presumed that there is some disproportion between the secretion and absorption of the cerebrospinal fluid. Working on this premise, DANDY attempted to reduce the secretion by extirpating the choroid plexus, and reported a small series of cases so treated in 1918. The operation carried a high mortality and was never widely practised. More recently, PUTNAM [2] and SCARFF [3] have shown that the choroid plexus of the lateral ventricles can be destroyed by endoscopic electrocoagulation. This method obviates the necessity of an open operation and the resulting collapse of the brain (and skull) in DANDY'S procedure, and the risks of operation have been greatly reduced. The published reports show that the operation is effective in some cases, and it certainly deserves a more extensive trial. As with spina bifida and encephalocele, selection of cases is important—the operation should not be done in cases of obvious mental deficiency or in the presence of other gross congenital abnormalities. But in contrast to spina bifida and encephalocele, the hydrocephalus may develop so rapidly that the passage of time cannot be allowed to help in the selection. This means that some infants must be dealt with before it is possible to make a reasonable assessment of their mental development, and there will always be the risk of preserving the life of a hopeless defective. Few parents would be unwilling to accept this risk however. At present this procedure seems to be more promising than any hitherto advanced for the treatment of infantile hydrocephalus.

At the other extreme, the sutures in the skull may close abnormally early, and thus limit the normal growth of the skull. This may be a manifestation of microcephalic idiocy in which the brain does not develop and the small skull is adequate housing. In other cases the brain may continue to develop and becomes too large for its case, with a resulting increase in intracranial pressure which causes headache and visual failure from secondary optic atrophy. Various deformities of the skull are associated with premature closure of the sutures, such as oxycephaly, turricephaly and scaphocephaly. In those cases in which increased intracranial pressure is manifested by headache, visual failure from secondary optic atrophy, and convolutional thinning seen in the radiograms, the pressure may be relieved by extensive craniotomy. KING [4] has devised and practised with success an operation which almost amounts to tesselation of the vault of the skull; a number of trephine holes are made and these are connected by saw cuts to convert the vault into a jig-saw of little squares of bone. The dura is not opened, but the need of the decompression is shown by the fact that the dura immediately expands to separate the fragments slightly, and after the operation the pressure signs and symptoms abate. The skull increases in size, and subsequently union takes place between the fragments to afford an efficient protection for the brain. These cases are not as common as infantile hydrocephalus, but KING'S results show that operation can help in selected cases.

TERMINOLOGY

MANY will read with pleasure Sir ALMROTH WRIGHT'S remarks on faulty nomenclature and some, who not only admire his loyalty to logic but share his classical tastes, will remember the line *Jam senior, sed cruda deo viridisque senectus*. Medical writers who habitually use "case" and "patient" as synonyms may be diffident about joining Sir ALMROTH in stoning the statisticians; we are not *quite* sure that the veteran protagonist himself has accurately described the statistician's use (or misuse) of the word "significant." We think that when a statistician says that the difference between two averages is significant he means that the difference between them—whether 10, 20 or 100 per cent.—is so great that if the samples compared had been drawn from the same universe (or population) it would be an event expected to occur by "chance" not oftener than once in "many" trials. The arithmetical translation of many is a matter of convention: conventionally not oftener than once in 22 trials is a usual translation. But this emendation does nothing to invalidate Sir ALMROTH'S general argument. The gravamen is that words like significant, random, chance, control—which have a vague, everyday connotation—are used sometimes in narrowly technical senses, sometimes ambiguously, with resultant logical confusion.

One way of avoiding this is to invent new technical terms. KARL PEARSON was fertile in such expedients. Some of his words—nomic heteroskedasticity, for instance—delighted Mr. Punch; and we think Sir

2. Putnam, T. J. *Surg. Gynec. Obstet.* 1943, 76, 171.
3. Scarff, J. E. *Amer. J. Dis. Child.* 1942, 63, 297.
4. King, J. E. J. *Amer. Surg.* 1942, 115, 488.

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ALMROTH'S "se-ipsic" would have delighted Lewis Carroll, whose portmanteau words deserve the tribute of more than a smile. "Mimsy," for instance, defined by Humpty Dumpty as flimsy and miserable, and rendered by moestenuis in Dr. P. R. Brinton's translation of *The Hunting of the Snark*, might be quite a useful term for melancholic patients (not cases) who were emaciated. Dumpty himself preferred the less logical (or statistical) method of making "glory" mean a nice knockdown argument; some statisticians (or users of statistical methods) make "significant" mean just that and are open to Alice's retort that it means no such thing. Logically Sir ALMROTH'S plea is unanswerable, but it is hard to persuade men to be logical in their use of words, and quite impossible to prevent a gradual change of connotation the result of which is at the best confusing, at the worst terrifying. Had ST. THOMAS AQUINAS known Greek and—as we are sure Sir ALMROTH would have advised—retained ARISTOTLE'S technical words for what became in common parlance substance and form, fewer human beings would have been burned alive. To be safe, a new technical vocabulary must be constructed every few generations. But as Latin and Greek are now, statistically speaking, very dead languages and Sir ALMROTH favours a Latin or Greek terminology, there is perhaps some hope of relative stability. If only he can persuade the young to use his very good and new terms.

It is important that the technical term shall not have already acquired an indelible colour. For instance, the psycho-analytical term libido is, linguistically speaking, quite adequate. Reference to Lewis and Short will satisfy the student that it was used by writers of the best period in a sense which is not utterly different from the Freudian significance. But, unfortunately, these writers used the adjective libidinosus always in an opprobrious sense, and the adjective in that sense passed into standard English. So the term has acquired an indelible colour—the wrong colour. Sir ALMROTH WRIGHT does not make that mistake. Se-ipsic is a first-class word.

Annotations

RETURN OF THE DISABLED

LIKE other agencies of its kind, the regimental association of the Loyal Regiment is concerned about what happens to ex-Servicemen on their return to civil life, and it has lately submitted its views to the Minister of Labour, to the Minister of Pensions, and to Mr. George Tomlinson, chairman of the Interdepartmental Committee on Rehabilitation. It believes that the interim scheme of the Ministry of Labour for the resettlement of the disabled is not entirely satisfactory and that thousands of men are being discharged to civilian life without being interviewed by a representative of the Ministry and in consequence often are directed to employment for which they are not physically fitted. It also holds that there is a shortage of training centres, and that changes are required to make the existing procedure more effective. The method at present adopted by the Ministry of Labour is wrong where a disabled man is allowed to drift into employment irrespective of his medical need; if on the other hand the Ministry of Pensions dealt with these cases, all papers would be available, together with the medical officer's recommendation as to type of employment. In the opinion of the association, the Ministry of Pensions might well undertake to train Service disabled personnel for civilian life.

Experience has shown that, left to themselves, men invalided out of the Services fare badly—medically, socially and in relation to work. But it has been demonstrated [1] that a procedure based on the mechanism of the Ministry of Labour's interim scheme can be of material assistance. It is probably true, as the Loyal Regiment's association has pointed out, that the procedure of the interim scheme sometimes breaks down because of failure to secure an enlightened estimate of the man's working capacity in relation to work likely to be available for him, or because of failure to ensure that necessary treatment is provided in non-pensionable cases as well as in these ranking for grant, or from lack of follow-up to see that the men have been able to hold the work in which they have been placed or which they have found for themselves. An investigation into a large series of these cases in Scotland showed that the men's difficulties were many and varied and that in nearly 20% of cases it was necessary to take exception to the course they adopted. In the Scottish series, within six months of leaving the service, 65% received care from their own doctor for the condition responsible for their discharge, whilst 16% received hospital care. Six months after return to civil life 16·5% were unemployed, 40% had gone back to their old work, 39% had taken up new work without training, and 4·5% had taken up new work with training under the interim scheme of the Ministry of Labour. Some 26% of the men made false starts at work at which they were unable to continue.

Probably the results in the Scottish series were obtained only by a determined effort to do what could be done for the men, medically and in relation to their work; and clearly the Scottish report involved that measure of follow-up so necessary in these cases if we are to prevent unfortunate experiences of the type to which the regimental association of the Loyal Regiment refers. But it is doubtful whether a rigid line should be drawn between Service and non-Service disabled. Their requirements in terms of rehabilitation and resettlement are essentially the same, and surely it is scarcely accurate to say that the Ministry of Labour is only training disabled civilians for work. The fact is that the Ministry of Labour is training, and is doubtless prepared to train, any disabled likely to benefit from such training, irrespective of the origin of the disability. But it is important that the work of fitting disabled people into work compatible with their disabilities should receive the careful approach it demands: it ought to be, in each region, a first charge on the energies of some knowledgeable and sympathetic person able and willing to reconcile the needs of the individual with available resources.

The Minister of Labour has declared his hope that this Parliamentary session will see an act passed obliging employers to arrange that a proportion of their workpeople shall be men or women disabled in the Services or in industry. Compulsion will thus be used to spread the responsibility voluntarily undertaken since the last war by employers on the King's Roll.

DOMESTIC SHORTAGE IN HOSPITALS

IT is to be hoped that the Government's adoption of the Hetherington report on domestic staff employed in hospitals will result in the action needed to remedy the serious situation in many hospitals. The suggested terms of employment were given on p. 618 of our issue of Nov. 13. The hospitals have suffered badly from this domestic shortage, and should not be blamed for difficulties which are not all of their own making. For example, in some of the up-graded hospitals quarters for domestic staff do not exist and short of new buildings cannot be provided. Medical staff are putting up with conditions

1. Health and Industrial Efficiency, Scottish Experiments in Social Medicine. Department of Health for Scotland. HMSO. 1943.

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which could not be tolerated except as part of the sacrifice of war, and many nurses are still in billets which are a poor substitute for a nurses' home or residence. This brings home the fact that the Hetherington Committee's desire for canteen facilities may require bricks and mortar to complete the picture. But there are bright spots; Professor Nixon tells us in a letter on another page that despite vicious air bombardment some of the Bristol hospitals have not suffered severely from the domestic shortage. One of the most important reasons for this is the status and consideration given to domestics in these hospitals. A peace-time tradition of strong loyalty, both to city and hospital, has not been upset by the upheaval of war. Long and faithful service is tangibly recognised. Quarters and food are good, reasonable off-duty time, leave and allowances are provided, and the domestic staff wear an honourable badge or uniform. Here are most of the essentials of a contented service, and to these is added the most important condition of all—wisdom and understanding at the head.

CALCIUM SULPHADIAZINE

OCCASIONS often arise when it is desirable to introduce a sulphonamide parenterally either because rapidity of action is required or because the patient is vomiting or comatose. In such cases it is the accepted practice to inject the sodium salt intravenously or intramuscularly. The intramuscular route is the easier one to use, but it tends to cause necrosis of the muscle at the site of injection on account of the alkalinity of the sodium salts. Sodium sulphapyridine and sodium sulphathiazole are particularly alkaline, and even sodium sulphadiazine, which is less alkaline, causes tissue irritation and tenderness if a concentration of 3–5% is used for subcutaneous injection. In attempts to circumvent this difficulty, trial has been made by Nelson and Spink [1] of the less alkaline calcium salts. Calcium sulphadiazine is soluble about 5·1% at 25° C. and the pH of the solution is 8·5 (neutrality, 7·4). It was given to 24 patients as a 4% solution, an initial dose of 4 g. being injected subcutaneously, followed by two doses each of 3 g. at 12-hour intervals. The blood-concentration curves of sulphadiazine resulting from these injections were closely similar to those produced by injection of sodium sulphadiazine, the concentrations of total drug ranging from 7 to 15 mg. per 100 c.cm., and the therapeutic action was what would be expected from these levels. Locally, no ill effects were observed. It should however be noted that the evidence for the absence of local damage depends only upon clinical observation; histological examination of the site of injection may reveal appreciable tissue damage produced by substances which have apparently caused no pain or swelling. But when calcium sulphathiazole (pH of 5% solution, 8·8) was employed, as a 4% solution injected subcutaneously, it caused redness, induration and pain at the site of injection in 3 out of 5 patients; accordingly calcium sulphathiazole is not recommended for subcutaneous injection. If these results are confirmed, the use of calcium sulphadiazine may offer a (slight) advantage for parenteral administration.

FAMILIAL AURICULAR FIBRILLATION

IT is wise to suspect thyrotoxicosis in the patient with auricular fibrillation and no cardiac lesion, but even after careful investigation there is a residuum of such cases where the cause remains a mystery. Among 376 cases of auricular fibrillation analysed by White and Jones [2] there were 30 "apparently free from heart disease." In a few cases in this small group arrhythmia seems to be familial: Wolff [3] records auricular fibrillation in two sets of brothers, in none of whom could an organic cause be found. In one of these families he found the condition in 3 brothers. The heart of the eldest was said to have been irregular at birth, and from the age of 7 years he had had a grossly irregular pulse. When first seen by Wolff in 1927, at the age of 25, the presence of auricular fibrillation was confirmed by the electrocardiogram, and the ventricular rate was 80 per minute. Normal rhythm was achieved by quinidine following digitalisation, but after several relapses, in which normal rhythm was always restored by the same method, the man refused further treatment, and when last seen in the early part of this year—16 years after the initial diagnosis—auricular fibrillation was still present and he was leading a normal, active life. In the other two brothers, aged 31 and 24, the heart was said to have been irregular since childhood and at the time of examination the ventricular rate was relatively slow—70 and 80 per min. In both, normal rhythm was restored by digitalis and quinidine. In the other family 2 brothers, aged 35 and 25, had paroxysmal auricular fibrillation, the arrhythmia having been present for 10 and 2 years; both were leading active lives, one being a "physical director." In the elder brother a paroxysm persisting for 6 months precipitated congestive heart-failure, and though subsequently he "was able to carry on well," when last seen, 11 years after the original diagnosis, the transverse diameter of the heart had increased from 14·1 cm. to 14·8 cm. In the first family, one of the brothers had had nose bleeding as a child and the other two growing pains; but if the arrhythmia had been due to a rheumatic infection there would almost certainly have been some evidence of a valvular lesion. Moreover, all three brothers led such active lives that there could scarcely have been much wrong with their myocardium. Wolff suggests that the arrhythmia may have been due to excessive vagal action, quoting as a possible sign of such preponderant vagal tone the slow ventricular rate and the fact that on the return of normal rhythm there was definite sinus arrhythmia. The irregularity said to have been present at birth in the eldest brother is more likely to have been due to sinus arrhythmia than to congenital auricular fibrillation. These cases provide striking evidence of how benign auricular fibrillation can be, even when maintained over long periods.

USE OF ZINC TO DELAY ABSORPTION

THE demonstration that the addition of zinc salts would prolong the hypoglycæmic action of insulin in laboratory animals was rapidly utilised in clinical practice. Experiments showed that the action was due to a slowing of absorption from the injection site, and subsequent research showed that this principle could also be used to prolong the action of pituitary gonadotrophin, the antidiuretic principle of the posterior pituitary, histamine, adrenaline, and morphine. Thus the retardation is not confined to a single type of chemical substance, and it is difficult to see why the success that attended the use of zinc insulin preparations did not foster clinical research in similar applications of zinc. At least one clinical report has, however, appeared in which Foldes [1] shows that it is possible to prolong the action of adrenaline, thiamine, and posterior pituitary antidiuretic factor by adding zinc to them. In the case of the posterior pituitary extract 0·4 i.u. alone or with the addition of 0·1% zinc was injected into two normal people and three patients with diabetes insipidus. The addition of zinc greatly prolonged the antidiuretic action in all cases, so that the diuresis following the ingestion of 1000 ml. of tap water, which started after 1½–4 hours when the extract was injected alone, only started 4–8 hours after the ingestion when zinc was added to the extract. In the diabetes insipidus patients daily injections of 10 i.u. of postpituitary extract with added zinc reduced the water intake and urine output by 30–50%, and the treatment was well tolerated for at least eight months. Similar

1. Nelson, C. T. and Spink, W. W. *Amer. J. med. Sci.* 1943, **206**, 315.
2. White, P. D. and Jones, T. D. *Amer. Heart J.* 1928, **3**, 302.
3. Wolff, L. *New. Engl. J. Med.* 1943, **229**, 396.

1. Foldes, F. F. *J. clin. Invest.* 1943, **22**, 499.

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results could only be obtained by two or three injections daily with the pituitary extract alone. A further advantage of the zinc-fortified extract was that the undesirable side effects, such as abdominal cramps, pallor and vertigo, which were often produced by the normal extract, did not appear. Whether this form of retard pituitary extract offers any advantages over the preparation of 'Pitressin tannate' in oil awaits controlled clinical comparisons. Similar prolonging effects have been obtained by Foldes when zinc is added to adrenaline or thiamine. In the case of adrenaline the rise in blood-sugar concentration was slower and the return to normal retarded with zinc-adrenaline, and the total effect as measured by the area bounded by the blood-sugar curve may be increased by 40%. This preparation was shown to have advantages in the treatment of asthma and when applied locally in dentistry. Here again the side effects caused by the general action of adrenaline disappear and the local anæsthetic action is lengthened. The delay in the absorption of thiamine produced by the addition of zinc was also considerable. The total amount of thiamine excreted in the urine within 24 hours of the injection was considerably diminished, usually by about 50%; a curve of the excretion was also altered, for whereas 50% of the day's excretion appears within an hour after the injection of thiamine alone this value is only obtained 3 hours after the injection of thiamine with zinc. Foldes points out that the delay in absorption depends not only on the concentration of zinc in the solution but also on the density of the subcutaneous tissue at the injection site. He makes his injections in the gluteal or thigh regions, and finds that the concentration of zinc necessary to produce a maximum prolongation of effect is much less in man (0·06–0·1%) than it is in rats or rabbits (0·5–1·2%). Fortunately solutions containing 0·12% of zinc can be injected subcutaneously without producing gross local reactions or discomfort. Daily injections of such concentrations were made for as long as six months without producing any general ill effects. This is not surprising when it is remembered that man usually eats 5–10 mg. of zinc every day in his food. Altogether these results suggest that the addition of zinc to injection media is worthy of closer clinical study.

PAYMENT OF HOSPITAL CONSULTANTS

THE visiting medical and surgical staff of Grimsby and District Hospital have asked for payment for their services, and the management committee have agreed in principle. No doubt when the comprehensive medical service is introduced, and specialists are provided for the whole population at the public charge, payment for hospital work of consultant physicians and surgeons will be a part of the cost; the principle has already been adopted by the British Hospitals Association. Before there was any prospect of such a service, with the introduction of contributory schemes all over the country there had been an accelerating change in the status of hospital patients. No longer the poor and needy of a century ago, they are now poor chiefly in relation to the high cost of their medical needs. Many, indeed most, hospital patients have habitually paid their family doctors in one way or another for domiciliary service. A great deal of the treatment at one time given by the doctor is now provided in or at hospital, and there is justice in the claim that payment for it is still due to the profession. Many voluntary hospitals receiving large sums from contributory schemes have already agreed to pay honorariums to their medical staffs. In some cases money has been allocated to a "staff fund" which is at the disposal of the members of the staff in their medical committee. In some, payments are made to the members of the staff direct; in at least one case the amount is graded according to seniority, which presumably is a measure of length of service; a senior surgeon in this instance receives £800 a year. Before the war there were already part-time surgical appointments, mainly in connexion with the treatment of fractures, where a salary was paid for a fixed term of years, during which the surgeon would be establishing a private practice in the neighbourhood. In some hospitals the visiting staff have agreed that they will not accept any payment for clinical work unless the maintenance costs are exceeded by receipts from patients. Some hospitals have appointed general surgeons on a salaried basis where the existing staff of the hospital are not of consultant rank and there are no suitable consultants practising in the district. Again, there are payments to members of voluntary hospital staffs for work done for local authorities and paid for by them. The Cancer Act clearly contemplates payment for services as well as for maintenance, but neither here nor under the Beveridge Assumption B is the cost of such services fully estimated. If the highest skill in any profession commands financial reward on a high scale, and Parliament decides that the highest skill shall be at the service of every person who needs it, it will have to be paid for handsomely. If it be not so paid, within a generation there may be no highly skilled people to hire. This is not to suppose that all a doctor's work will ever be paid for; the best service a doctor can give is something that cannot be bought.

In one voluntary hospital after another—it was heard lately at Swansea, and Grimsby follows suit—the voice of the administrator is raised over the question of the new status of doctors and its implications. Should a paid servant of the governing body have a seat and a vote at its deliberations? It raises once again the recurrent question—"advisory" or "executive." Purely advisory committees are invalids from birth; their expectation of life is brief. There is, however, no reason why a committee, advisory in function, should not be maintained in healthy vigour by the delegation to it of specified executive functions; and by rights to initiate policy proposals, and to publish reports. Even in the matter of finance, which is sacrosanct from those who in one case are potential beneficiaries, or in another have not withstood the test of the hustings and been elected by popular vote—even in this matter of money there are the possibilities of budgets or impressed accounts which leave the people who have to do the job, and who alone know the job in all its bearings, to plan how allotted money should be spent. The problems that call urgently for solution begin to permit of definition. Hospital staffs must be paid, or at least subsidised. Receipt of payment modifies the honorary status. When management, administration and finance are under consideration, the doctors are no longer entirely unprejudiced persons. None of those functions can be fully performed without participation by the experts. What is the democratic way of meeting the problem so as to secure the essential good will of all parties?

NURSING IN THE COLONIAL EMPIRE

THE Colonial Office announces the formation of a committee, with Lord Rushcliffe as chairman, to examine the training of nurses who are to serve in Colonial territories, having regard to the need in those territories for increased public-health activities and the development of community welfare. The members include Dr. Mary Blacklock, Dr. W. H. Kauntze, Dr. H. M. C. Macaulay, Dr. H. A. Moody, and Dr. A. G. H. Smart. Mr. H. W. Davidson, of the Colonial Office, is the secretary.

Sir EDWARD POULTON, FRS, who was for forty years Hope professor of zoology at Oxford University, died on Saturday last at the age of 87. He was a good Darwinian and a convinced believer in the sufficiency of natural selection as the ruling factor in evolution. But senior members of our profession may well remember him as the author of *The Colours of Animals: their Meaning and Use*, which imbued the everyday facts of observation with a new meaning and interest for them. The late Dr. E. P. Poulton, of Guy's Hospital was his elder son.

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Special Articles

INTRA-GROUP TENSIONS IN THERAPY

THEIR STUDY AS THE TASK OF THE GROUP

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THE term "group therapy" can have two meanings. It can refer to the treatment of a number of individuals assembled for special therapeutic sessions, or it can refer to a planned endeavour to develop in a group the forces that lead to smoothly running coöperative activity.

The therapy of individuals assembled in groups is usually in the nature of explanation of neurotic trouble, with reassurance; and sometimes it turns mainly on the catharsis of public confession. The therapy of groups is likely to turn on the acquisition of knowledge and experience of the factors which make for a good group spirit.

A Scheme for Rehabilitation (W. R. B.)

In the treatment of the individual, neurosis is displayed as a problem of the individual. In the treatment of a group it must be displayed as a problem of the group. This was the aim I set myself when I was put in charge of the training wing of a military psychiatric hospital. My first task therefore was to find out what the pursuit of this aim would mean in terms of time-table and organisation.

I was not able to work at this task in an atmosphere of cloistered calm. No sooner was I seated before desk and papers than I was beset with urgent problems posed by importunate patients and others. Would I see the NCOs in charge of the training wing and explain to them what their duties were? Would I see Private A who had an urgent need for 48 hours' leave to see an old friend just back from the Middle East? Private B, on the other hand, would seek advice because an unfortunate delay on the railway had laid him open to misunderstanding as one who had overstayed his leave. And so on.

An hour or so of this kind of thing convinced me that what was required was discipline. Exasperated at what I felt to be a postponement of my work I turned to consider this problem.

DISCIPLINE FOR THE NEUROTIC

Under one roof were gathered 300–400 men who in their units already had the benefit of such therapeutic value as lies in military discipline, good food and regular care; clearly this had not been enough to stop them from finding their way into a psychiatric hospital. In a psychiatric hospital such types provide the total population and by the time they reach the training wing they are not even subject to such slight restraint as is provided by being confined to bed.

I became convinced that what was required was the sort of discipline achieved in a theatre of war by an experienced officer in command of a rather scallywag battalion. But what sort of discipline is that? In face of the urgent need for action I sought, and found, a working hypothesis. It was, that the discipline required depends on two main factors: (1) the presence of the enemy, who provides a common danger and a common aim; and (2) the presence of an officer who, being experienced, knows some of his own failings, respects the integrity of his men, and is not afraid of either their goodwill or their hostility.

An officer who aspires to be the psychiatrist in charge of a rehabilitation wing must know what it is to be in a responsible position at a time when responsibility means having to face issues of life and death. He must know what it is to exercise authority in circumstances that make his fellows unable to accept his authority except in so far as he appears to be able to sustain it. He must know what it is to live in close emotional relationship with his fellow men. In short, he must know the sort of life that is led by a combatant officer. A psychiatrist who knows this will at least be spared the hideous blunder of thinking that patients are potential cannon-fodder, to be returned as such to their units. He will realise that it is his task to produce self-respecting men socially adjusted to the community and therefore willing to accept its responsibilities whether in peace or war. Only thus will he be free from deep feelings of guilt which effectually stultify any efforts he may otherwise make towards treatment.

What common danger is shared by the men in the rehabilitation wing? What aim could unite them?

There was no difficulty about detecting a common danger; neurotic extravagances of one sort and another perpetually endanger the work of the psychiatrist or of any institution set up to further treatment of neurotic disorders. The common danger in the training wing was the existence of neurosis as a disability of the community. I was now back at my starting-point—the need, in the treatment of a group, for displaying neurosis as a problem of the group. But, thanks to my excursion into the problem of discipline, I had come back with two additions. Neurosis needs to be displayed as a danger to the group; and its display must somehow be made the common aim of the group.

But how was the group to be persuaded to tackle neurotic disability as a communal problem?

The neurotic patient does not always want treatment, and when at last his distress drives him to it he does not want it wholeheartedly. This reluctance has been recognised in the discussion of resistance and allied phenomena; but the existence of comparable phenomena in societies has not been recognised.

Society has not yet been driven to seek treatment of its psychological disorders by psychological means because it has not achieved sufficient insight to appreciate the nature of its distress. The organisation of the training wing had to be such that the growth of insight should at least not be hindered. Better still if it could be designed to throw into prominence the way in which neurotic behaviour adds to the difficulties of the community, destroying happiness and efficiency. If communal distress were to become demonstrable as a neurotic by-product, then neurosis itself would be seen to be worthy of communal study and attack. And a step would have been taken on the way to overcome resistance in the society.

Two minor, but severely practical, military requirements had to be satisfied by the training wing. The organisation should if possible provide a means by which the progress of the patients could be indicated, so that the psychiatrist could tell if a man were fit for discharge. It would also be useful to have an indication of the patient's direction, of his effective motivation, so that an opinion could be formed about the sort of work to which he should be discharged.

I found it helpful to visualise the projected organisation of the training wing as if it were a framework enclosed within transparent walls. Into this space the patient would be admitted at one point, and the activities within that space would be so organised that he could move freely in any direction according to the resultant of his conflicting impulses. His movements, as far as possible, were not to be distorted by outside interference. As a result his behaviour could be trusted to give a fair indication of his effective will and aims, as opposed to the aims he himself proclaimed or the psychiatrist wished him to have.

It was expected that some of the activities organised within the "space" would be clearly war-like, others equally clearly civilian, others again merely expressions of neurotic powerlessness. As the patient's progress was seen to run along one or other of these paths so his "assets and liabilities," to use a phrase employed in the sphere of officer selection by Major Eric Wittkower, could be assessed with reasonable objectivity. As his progress appeared to be towards one or other of the possible exits from this imaginary space, so his true aim could be judged.

At the same time the organisation could be used to further the main aim of the training wing—the education and training of the community in the problems of interpersonal relationships. If it could approximate to this theoretical construct it would enable the members of the training wing to stand (as it were) outside the framework and look with detachment and growing understanding upon the problems of its working.

THE EXPERIMENT

The training wing, consisting of some hundred men, was paraded and was told that in future the following regulations would apply:—

1. Every man must do one hour's physical training daily unless a medical certificate excused him.

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2. Every man must be a member of one or more groups—the groups designed to study handicrafts, Army correspondence courses, carpentry, map-reading, sand-tabling, &c.

3. Any man could form a fresh group if he wanted to do so either because no group existed for his particular activity or because, for some reason or other, he was not able to join an existing similar group.

4. A man feeling unable to attend his group would have to go to the rest-room.

5. The rest-room would be in charge of a nursing orderly, and must be kept quiet for reading, writing or games such as draughts. Talking in an undertone was permitted with the permission of the nursing orderly but other patients must not be disturbed; couches were provided so that any men who felt unfit for any activity whatever could lie down. The nursing orderly would take the names of all those in the rest-room as a matter of routine.

It was also announced that a parade would be held every day at 12.10 for making announcements and conducting other business of the training wing. Unknown to the patients, it was intended that this meeting, strictly limited to 30 minutes, should provide an occasion for the men to step outside their framework and look upon its working with the detachment of spectators. In short, it was intended to be the first step towards the elaboration of therapeutic seminars.

For the first few days little happened; but it was evident that among the patients a great deal of discussion, and thinking, was taking place. The first few 12.10 meetings were little more than attempts to gauge the sincerity of the proposals; then the groups began to form in earnest. Among other more obvious activities there was a programme group to chart out working hours of groups and their location, to make announcements and to allocate tickets for free concerts and such-like. In a very short time the programme room, which showed by means of flags on a work-chart the activities of every man in the training wing, now growing rapidly in size, became almost vernal in its display of multi-coloured flags of patterns suggested by the ingenuity of the patients. By a happy thought a supply of flags bearing the skull and crossbones was prepared, ready for the use of such gentlemen as felt compelled to be absent without leave.

The existence of this brave display gave occasion for what was probably the first important attempt at therapeutic coöperation at a 12.10 meeting. It had been my habit, on going the rounds of the groups, to detach one or two men from their immediate work and take them with me "Just to see how the rest of the world lives." I was therefore able to communicate to this meeting an interesting fact observed by myself and by others who had gone round with me. Namely, that, although there were many groups and almost entire freedom to each man to follow the bent of his own inclinations, provided he could make a practical proposal, yet very little was happening. The carpenter's shop might have one or two men at most; car maintenance the same; in short, I suggested, it almost looked as if the training wing was a façade with nothing behind it. This, I said, seemed odd because I remembered how bitterly the patients in the training wing had previously complained to me that one of their objections to the Army was the "eyewash." Its presence in the training wing, therefore, really did seem to be a point worth study and discussion.

This announcement left the audience looking as if they felt they were being "got at." I turned the discussion over at that point as a matter of communal responsibility and not something that concerned myself, as an officer, alone.

With surprising rapidity the training wing became self-critical. The freedom of movement permitted by the original set-up allowed the characteristics of a neurotic community to show with painful clarity; within a few days men complained that the wards (hitherto always claimed to be spotless) were dirty and could not be kept clean under the present system of a routine hour for ward fatigues. They asked and were allowed to organise under the programme group an "orderly group," whose duties it would be to keep the wards clean throughout the day. The result of this was that on a subsequent weekly inspection the Commanding Officer of the hospital remarked on the big change in cleanliness that had taken place.

SOME RESULTS

It is impossible to go into details about the working of all the therapeutic aspects of the organisation; but two examples of method and result may be given.

Shortly after the new arrangement started, men began to complain to me that patients were taking advantage of the laxity of the organisation. "Only 20%," they said, "of the men are taking part and really working hard. The other 80% are just a lot of shirkers." They complained that not only was the rest-room often filled with people simply loafing, but that some men even cut that. I was already aware of this, but refused, at least outwardly, to have its cure made my responsibility. Instead, I pointed out that, at an ABCA meeting some weeks before, the discussion had at one point centred on just that question—namely, the existence in communities (and the community then under discussion was Soviet Russia) of just such uncoöperative individuals as these and the problem presented to society by their existence. Why, then, did they sound so surprised and affronted at discovering that just the same problem afflicted the training wing?

This cool reply did not satisfy the complainants—they wanted such men to be punished, or otherwise dealt with. To this I replied that no doubt the complainants, themselves, had neurotic symptoms, or they would not be in hospital; why should their disabilities be treated in one way and the disabilities of the 80% treated in another? After all, the problem of the "80%" was not new; in civil life magistrates, probation officers, social workers, the Church and statesmen had all attempted to deal with it, some of them by discipline and punishment. The "80%," however, were still with us; was it not possible that the nature of the problem had not yet been fully elucidated and that they (the complainants) were attempting to rush in with a cure before the disease had been diagnosed? The problem, I said, appeared to be one that concerned not only the training wing, or even the Army alone, but to have the widest possible implications for society at large. I suggested that they should study it and come forward with fresh proposals when they felt they were beginning to see daylight.

It is worth remarking at this point that my determination not to attempt solution of any problem until its borders had become clearly defined helped to produce, after a vivid and healthy impatience, a real belief that the unit was meant to tackle its job with scientific seriousness. One critic expostulated that surely such a system of patient observation would be exceedingly slow in producing results, if indeed it produced results at all. He was answered by reminding him that only a few days previously the critic himself had spontaneously remarked that the military discipline and bearing of the training wing had improved out of all recognition within the short period of a month.

The second example illustrates the development of an idea from the stage of rather wild, neurotic impulse to practical common-sense activity.

By far the largest group of men proposed the formation of a dancing class. Despite the veneer of a desire to test my sincerity in promising facilities for group activity, the pathetic sense of inferiority towards women that underlay this proposal, by men taking no part in fighting, was only too obvious. They were told to produce concrete proposals. The steps by which this was done need not detain us; in the end the class was held during hours usually taken up by an evening entertainment; it was confined, by the volition of the men themselves, only to those who had no knowledge at all of dancing and the instruction was done by ATS staff. In short, a proposal, which had started as a quite unpractical idea, quite contrary to any apparently serious military aim, or sense of social responsibility to the nation at war, ended by being an inoffensive and serious study carried out at the end of a day's work. Furthermore, the men concerned had had to approach the Commanding Officer, the ATS officers and the ATS, as a matter of discipline in the first place and social courtesy in the second.

In the meantime, the 12.10 parades had developed very fast into business-like, lively and constructive meetings and that in spite of the fact that the wing was now receiving heavy reinforcements of patients new to the organisation, as well as losing others who had been dis-

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charged from hospital, often when they had become very useful.

Within a month of the inception of the scheme big changes had taken place. Whereas at first it almost seemed difficult to find ways of employing the men, at the end of the month it was difficult to find time for the work they wanted to do. Groups had already begun to operate well outside what were ordinarily considered parade hours; absence without leave was for a considerable period non-existent, and over the whole period there was only one case; patients not in the training wing became anxious to come over to it; and despite the changing population, the wing had an unmistakable esprit-de-corps, which showed itself in details such as the smartness with which men came to attention when officers entered the room at the 12.10 meetings. The relationship of the men to the officers was friendly and coöperative; they were eager to enlist the officers' sympathy in concerts and other activities which they were arranging. There was a subtle but unmistakable sense that the officers and men alike were engaged on a worth-while and important task even though the men had not yet grasped quite fully the nature of the task on which they were engaged. The atmosphere was not unlike that seen in a unit of an army under the command of a general in whom they have confidence, even though they cannot know his plans.

Comment

It is not possible to draw many conclusions from an experiment lasting, in all, six weeks. Some problems that arose could not be fully explored in the time; others may not be openly discussed while the war is still in progress.

It was evident that the 12.10 meetings were increasingly concerned with the expression, on the part of the men, of their ability to make contact with reality and to regulate their relationships with others, and with their tasks, efficiently. The need for organisation of seminars for group therapy had become clear, and the foundation of their commencement appeared to be firmly laid.

The whole concept of the "occupation" of the training wing as a study of, and a training in, the management of interpersonal relationships within a group seemed to be amply justified as a therapeutic approach. Anyone with a knowledge of good fighting regiments in a theatre of war would have been struck by certain similarities in outlook in the men of such a unit and the men of the training wing. In these respects the attempt could be regarded as helpful; but there were also lessons to be learnt.

Some of these raised serious doubts about the suitability of a hospital milieu for psychotherapy. It was possible to envisage an organisation that would be more fitly described as a psychiatric training unit; and, indeed, some work had been done in the elaboration of an establishment and a modus operandi of such a unit. With regard to the psychiatrist, also, there was room for some readjustment of outlook. If group therapy is to succeed it appears necessary that he should have the outlook, and the sort of intuitive sympathetic flair, of the good unit commander. Otherwise there will always be a lingering suspicion that some combatant officers are better psychiatrists, and achieve better results, than those who have devoted themselves to the narrow paths of individual interview.

Finally, attention may be drawn again to the fact that society, like the individual, may not want to deal with its distresses by psychological means until driven to do so by a realisation that some at least of these distresses are psychological in origin. The community represented by the training wing had to learn this fact before the full force of its energy could be released in self-cure. What applied to the small community of the training wing may well apply to the community at large; and further insight may be needed before wholehearted backing can be obtained for those who attempt in this way to deal with deep-seated springs of national morale.

Application of Group Therapy in a Small Ward (J. R.)

An experiment in the application of group therapy, in the newer sense, to patients in a ward of 14–16 beds was made in the hospital division of the same institution. Each patient had an initial interview with the psychiatrist in which a personal history was taken in the usual way; thereafter there were group discussions every morning before the hour's "route march"; and after it, as the patients returned to the ward, they could call in at the psychiatrist's room to discuss privately the topic of the group discussion, which had usually been the subject of conversation on the "route march," and their personal feelings about it.

The therapeutic talks centred on their personal difficulties in putting the welfare of the group in the first place during their membership of the group. The topics of the group discussion included the following:—

(*a*) Since residence in this ward is temporary, some going into the training wing and others coming from the admission ward to take their place, how is this changing situation to be met? We—the distinction between physician and patient, officer and other ranks was another special topic—should have to accommodate ourselves to people entering our group to whom our attitude to our ward (it was always referred to as "our ward") meant nothing at all; either we could regard them as outsiders or as imperfectly accommodated insiders. So too with those who "went out" into the training wing: they could not expect to retain the ward-group attitudes indefinitely, nor could they expect to include the much larger training wing in their ward group; they would have to find their place in the new groupings and allow their ward experience to be but a memory, but it was to be hoped a helpful memory. Then there was the further point, whether those in the training wing should come back to the daily group discussions, the question being not what they would get out of them (there seemed little doubt they were among the most interesting experiences we had ever had) but whether, coming from another group-formation, or while losing their ward contact, they might not prove a distraction to those who were finding their feet in the ward group.

(*b*) How far were the differences of rank acquired "outside" to determine the behaviour of the members of the group to one another while in the ward? Would an attempt at equality work, or would it be better, while not forgetting the rank acquired outside, to consider what equivalents of rank emerge when in the ward, and if so the basis of these equivalents?

(*c*) What makes for discontent in the ward? Is it something peculiar to this ward, or any ward, or to any association of people?

(*d*) What makes for content and happiness in the ward? Is it the exercise of individual initiative having for its sole criterion the free expression of the person's own private enterprises, or does that come only after recognition of what the ward needs from the individual? Is there a fundamental incompatibility between these two points of view, and if so does it apply to all or only some members? If to only some, what causes it to appear in these, and is it a characteristic they carry through in their lives all the time or is it sometimes more strong than at others? If it varies, can the ward diminish it without being oppressive to those individuals so endowed?

The effect of this approach to the problem of neurosis was considerable. There was a readiness, and at times an eagerness, to discuss both in public and in private the social implications of personality problems. The neurotic is commonly regarded as being self-centred and averse from coöperative endeavour; but perhaps this is because he is seldom put in an environment in which *every* member is on the same footing as regards interpersonal relationships.

The experiment was interrupted by posting of personnel, so I cannot give clinical or statistical results; but it seemed to show that it is possible for a clinician to turn attention to the structure of a group and to the forces operating in that structure without losing touch with his patients, and further that anxiety may be raised either inside or outside the group if this approach is made.

Conclusions

We are now in a better position to define the "good group spirit" which has been our aim.

It is as hard to define as is the concept of good health in an individual; but some of its qualities appear to be associated with:—

(*a*) A common purpose, whether that be overcoming an enemy or the defending and fostering an ideal or a creative construction in the field of social relationships or in physical amenities.

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(b) Common recognition by members of the group of the "boundaries" of the group and their position and function in relation to that of larger units or groups.

(c) The capacity to absorb new members, and to lose members without fear of losing group individuality—i.e., "group character" must be flexible.

(d) Freedom from internal subgroups having rigid (i.e., exclusive) boundaries. If a subgroup is present it must not be centred on any of its members nor on itself—treating other members of the main group as if they did not belong within the main group barrier—and the value of the subgroup to the function of the main group must be generally recognised.

(e) Each individual member is valued for his contribution to the group and has free movement within it, his freedom of locomotion being limited only by the generally accepted conditions devised and imposed by the group.

(f) The group must have the capacity to face discontent within the group and must have means to cope with discontent.

(g) The minimum size of a group is three. Two members have personal relationships; with three or more there is a change of quality (interpersonal relationship).

These experiments in a rehabilitation wing of a military psychiatric neurosis hospital suggest the need for further examination of the structure of groups and the interplay of forces within the groups. Psychology and psychopathology have focused attention on the individual often to the exclusion of the social field of which he is a part. There is a useful future in the study of the interplay of individual and social psychology (viewed as equally important interacting elements), and war-time makes this study an urgent issue.

Our thanks are due to Lieut.-Colonel Pearce, RAMC, for the opportunity to begin work in this field.

CANADA

THE Dominion Government has voted two million dollars for the production of penicillin in Canada. The project is already under way in the Connaught laboratories of the University of Toronto, and mass production is expected in about four months.

MEDICAL EDUCATION

Acceleration of the undergraduate course in medicine in the various universities has been accomplished by shortening the vacation periods so that a full academic year plus a third of the following year has been given in 12 months. Students are enrolled only once a year, so that in the University of Toronto there is no class of fourth-year students at the opening of the term. The third-year class, having completed two trimesters before vacation, will pass into the fourth year at the end of the Christmas term and continue until July, 1944. Nine universities are giving the full course in medicine and one is giving the three premedical years. All have accelerated their courses but all did not adopt the scheme at the same time so that the Medical Council of Canada is holding two or more examinations each year. In 1943 examinations were held in January, July and October.

Queen's University in Kingston was the first in Canada to receive women as students in medicine. After the Women's Medical College of Toronto was absorbed by the University of Toronto, Queen's altered its policy and women were not enrolled until this year when the "men only" was removed from the calendar. In the first year in Toronto 20% of the class are women. This is gratifying to the feminists but the tax-payer may view the matter differently. The cost to the state of training a student in medicine is high, since all Canadian universities receive aid from the provinces in which they are situated. A considerable proportion of the women graduates do not enter practice or abandon it; this is because the marriage-rate of women in medicine, within five years of graduation, is very much higher than in any other faculty.

Refresher courses for practitioners are being given in October in Dalhousie University, Halifax, and in the University of Alberta, Edmonton. The annual summer school was held in Vancouver during the summer. In Ontario the annual district meetings of the Ontario Medical Association and the monthly meetings of local medical societies, to which speakers from university centres are often invited, serve a similar purpose. The University of Montreal is giving a five-day course in pædiatrics for French-speaking physicians in the province of Quebec.

DEATH OF A PHYSICIAN

Dr. William Proudfoot Caven died in Toronto recently at the age of eighty-two. For forty years he had practised as a consulting physician and held an unique place in the respect and affection of the medical practitioners in Ontario. The late Prof. J. E. Graham was the first in Toronto to limit his practice to consultations and Dr. Caven took over Dr. Graham's house with the practice. He sometimes told of the clause which Dr. Graham insisted on putting into the deed for the property, under which Dr. Caven covenanted to take at least one full month of vacation each year. The reason given for this unusual limitation was stated by the vendor: "I've taken a lot of trouble in establishing a consulting practice and I am not going to have it spoiled by a tired man." There is a possible moral in this story.

CANADA'S BEVERIDGE

The Social Security Committee of the Parliament of Canada is now engaged in a study of the briefs that have been submitted by all the interests concerned. The Canadian Medical Association has spoken for the profession. When the study is completed a bill will be brought before Parliament to provide a model act. This will then be presented to the legislatures of the nine provinces. Provincial acts must conform in substance to that enacted by the federal government. Grants in aid will be paid to the provinces when their acts are approved.

The model act is designed to provide security for every citizen "from the cradle to the grave" or whatever variant of that slogan may be popular at the time. The provinces may have ideas of restricting this general application by setting a maximum income for those receiving the benefits. There may also be differences in the type of administration whether by commission or by government bureau or other bodies as the several provinces may select. Care of the sick and prevention of disease will be an important part of the provisions in the federal act. In some of the provinces the political parties are vying with each other in proposing extensions to the basic service; a lower standard would certainly not be accepted. The reaction of the medical profession cannot be estimated until the bill is reported in Parliament at its next session. A committee of the council of the Canadian Medical Association have worked faithfully in preparing their brief, but some legislators are sure to have strange notions of the value of medical service.

THE JOURNALS KEEP ABOVE WATER

A comment on the effective defence of North Atlantic shipping against the U-boat menace is the fact that every issue of the *Lancet* and of the *British Medical Journal* with the exception of one number has been delivered to Canadian subscribers in the four years of war.

CHINA'S HEALTH PROBLEMS

A little volume, issued [1] by the secretary of the Chinese Medical Association in response to many requests, gives a useful epitome of the various agencies at work in China under the stress of war. With a morbidity-rate estimated at 4% of the population, and a death-rate of not less than 25 per 1000, China's health problem might well appear staggering; but steps have been taken to build up a comprehensive service and to foster medical and health education. Tribute is paid to assistance from abroad, both in the maintenance of mission hospitals and medical schools, the grant of funds and medical supplies through Red Cross and other relief organisations, and the personal service of doctors and nurses. It is, however, the National Health Administration and the Chinese Red Cross which are mainly responsible for the provision of China's needs, and their action in developing emergency training schools and relief corps, and in building up the manufacture of drugs and surgical equipment, the control of epidemics and the establishment of health centres, gives promise of what may be expected when conditions permit.

1. Szeming Sze. Office of the Association, Washington, DC. Pp. 60. $1.

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GENERAL MEDICAL COUNCIL

PRESIDENT'S ADDRESS

OPENING on Tuesday the 159th session Mr. H. L. EASON spoke with feeling of the death of Mr. G. H. Edington, who represented the physicians and surgeons of Glasgow 1928–1940. His shrewd comments on matters both educational and moral, his happy social interests and attractions, and his unfailing sense of humour would long be remembered. By the resignation of Sir Farquhar Buzzard the Council had lost a scholar, an athlete, a wise physician, and one who had done a great work for clinical and social medicine during his tenure of the regius chair at Oxford. He welcomed as his successor the new regius, Prof. A. W. M. Ellis. The Council had heard with the most sincere regret of the resignation, on medical advice, of Sir John Stopford, who had represented Manchester University since 1927 and was appointed chairman of business in 1939. "He has endeared himself to the Council by his personal charm, a modesty only equalled by his talents, and a cheerfulness and energy which no amount of work or responsibility could depress." His successor was Prof. Henry Raper, Brackenbury professor of physiology.

THE SPACKMAN CASE

A case to which the Council were a party had, said the President, for the first time been carried to the House of Lords. The Law Lords decided in August, on an appeal by the Council from a decision of the Court of Appeal in June, 1942, on an appeal by a practitioner from a decision of the Divisional Court in March, 1942, that the Council had not made "due inquiry" within the meaning of section 29 of the Medical Act, 1858, into the case of the practitioner, because on the consideration in November, 1941, of a charge against him of infamous conduct in a professional respect, on the ground that he had committed adultery with a patient, the Council refused leave to the practitioner's solicitor to call certain evidence which was not before the Divorce Court, with a view to challenging the correctness of the judge's conclusion on the issue of adultery. It would be the duty of the Council during this session, he said, to consider the bearing of this decision both on the particular case and on the GMC's rules of procedure in future. For the moment he had only two things to say about the matter. First, we are deeply indebted to the House of Lords for the authoritative guidance which they have given to us in construing a section of the statute which it is our duty to administer with scrupulous fairness. Their observations may well come to rank in the literature which has gathered round the section with the definition of "infamous conduct in any professional respect" upon which the Court of Appeal agreed in 1894. Secondly, we shall, I am sure, endorse and cordially reciprocate the view of the proceedings, as between the Medical Defence Union, who espoused the practitioner's cause, and the Council, expressed with such amity, not to say generosity, by the President of the Union at their annual meeting in September (see *Lancet*, Oct. 9, p. 459).

REGISTER OF SPECIALISTS

The Council would be invited during the session to consider among themselves a note agreed with Mr. Ernest Brown as Minister of Health of the proceedings at a deputation from the Council received by him and by the Secretary of State for Scotland in June about the proposal which (in default of further light on the subject), said the President, I am still constrained to describe as a proposal to establish a register of specialists under the auspices of certain licensing corporations.

Thanks to the indefatigable labour of the Council's inspectors in medicine, surgery, and midwifery, the standard of proficiency required from the large majority of candidates for qualification and registration had already come under a keen and impartial scrutiny; and notwithstanding the acceleration of admission of candidates to examinations, the reports of the inspectors left the Council without anxiety about the maintenance of this standard as an essential safeguard for the public.

MEDICINE AND THE LAW

Agents Provocateurs

THE recent failure of the prosecution of Dr. Theodor Goldschmidt for alleged false certification may persuade our usually impeccable police and their advisers that difficulty of proof does not justify their invention of an offence. Dr. Goldschmidt was consulted by a patient who gave his name as Hankinson. The patient said he had been in bed two days with influenza, had pains in his head and felt hot. The doctor found his temperature to be 99° F. and his pulse to be 100; he told Hankinson to go to bed, prescribed a stock mixture (Mst. ammon. chlor. co.) and gave him a certificate, correctly dated. The charge was 3*s.* 6*d.* for the consultation and the medicine, and 1*s.* for the certificate. Soon afterwards, it appears, two men arrived who arrested Dr. Goldschmidt; he was taken to the police-station, being allowed to visit an urgent case on the way and was let out on bail; his finger-prints were taken at the police-station as he made no objection; some of his professional documents were removed by the police. He was afterwards charged before Mr. Daniel Hopkin, the North London magistrate. The alleged offences concerned two other men, Thorpe and Smith, as well as Hankinson. It was clear that all three had been selected and coached by the police to deceive the accused doctor and to trap him into giving certificates on the faith of what they told him of their condition. They were employees at an aircraft factory and, having told Dr. Goldschmidt the tales devised by the police, they then went to see the factory doctor who found them fit; presumably they told him a different story. In Smith's case, it seems, he had visited Dr. Goldschmidt last August for a like purpose and had then been refused a certificate. Practice, perhaps, had made him a better actor by November.

The magistrate dismissed the charges with ten guineas costs against the Director of Public Prosecutions. He observed that the methods employed were "quite alien to the spirit of British law and ought to be condemned." In his opinion Dr. Goldschmidt had reasonable cause to believe that the certificates were given in good faith. Det. Sergt. Barker, who arrested the doctor, was asked by Mr. Hopkin if the term *agent provocateur* could be applied to each of the three men. "I think it could, Sir," he replied. Although the police cannot appeal against the acquittal, the last may not have been heard of the proceedings.

"Agreed Medical Report"

What is an agreed medical report? The question is important in claims for damages for personal injuries because in such cases the formal summons for directions (one of the preliminary steps taken by the court to narrow and define the issue and to shorten the proceedings at the trial) contains a standard provision "that medical reports be agreed between the parties if possible"; in default of such agreement, the number of medical witnesses on each side is limited. In this connexion the *Law Times* of Nov. 6 has a useful note on a recent ruling of the Court of Appeal in Harrison *v.* Liverpool Corporation. Independent reports made by doctors on each side without agreement on the facts and opinions therein contained cannot, says our contemporary, be regarded as agreed medical reports. To be an "agreed medical report" the document must contain either (i) a statement of facts and opinions on which the doctors on both sides who make it are agreed, or (ii) where the parties agree to accept a report from one doctor, the facts and opinions stated and given by that doctor. In future, by direction of the Court of Appeal, the order made on the summons for directions should refer to "a medical report" not to "medical reports"; but this will not preclude the making of more than one agreed report where different doctors on each side deal with different aspects of the case—e.g., where different specialists deal with different kinds of injury. Lastly, where doctors are instructed with a view to obtaining an agreed medical report, the parties should agree on a statement of any relevant matters to which it is desired that the attention of the doctors should be directed. Thus, in claims at common law or for breach of statutory duty, the

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doctors should be instructed that general disability is a relevant matter as well as disability in respect of earning capacity.

The medical profession will welcome this clarification and its emphasis, however indirect, upon the value of professional unanimity. Greater dignity and a more impressive effect upon lay opinion are achieved by medical agreement than by the controversies of experts in the witness-box.

In England Now

A Running Commentary by Peripatetic Correspondents

THE appointment of a barrister to be Minister of Health means that the Government has five KCs and not a single scientific qualification. In the ideal state the position would be reversed, for the only quality you can be sure of in a successful barrister is that he has the trick of words, the actuality behind the words may be a foreign land to him.

If Medicine invaded the Law as the Law, represented by Mr. Willink, is invading a medical sphere, we should probably get a less facile but deeper justice. I can imagine a medical judge presiding over a Court of Appeal, in reversing the judgment of a lower court, saying: "The salient point in this case, which must be constantly in our minds in considering the evidence, is that the chairman of the bench in the court of first instance, a dominating, indeed a domineering character, was at the relevant time suffering from an inflamed sentinel pile, and in working up an emotional leucocytosis to combat this, included the accused, who bore some resemblance to his own brother-in-law, in the ambit of his hatred."

Still, if we must have a lawyer—and there's no denying they can paint the rottenest case in the rosiest terms—I can think of nobody more agreeable than Mr. Willink. I remember him at the first Duke of York's camp and some years after as a conscientious washer-up, a sturdy rugger player, with an exuberant and energetic cheerfulness and a fund of that unfixed affection that goes by the name of altruism. Of course, like everyone else, I expect he has degenerated a good deal since his twenties, but he's been in Parliament only three years, and personally I wish him every possible success.

* * *

The Brains Trust last week were talking about university students earning money out of school hours to help pay for their education. The voice from America (it was a Trans-atlantic session), that of Mr. Leon Henderson, told us that we are wrong in thinking that a large proportion of American students work their passage by spare-time work; very few, he said, do more than supplement their incomes in this way, though there is one college where the students do school work for six weeks and six weeks on a paying job alternately. The general opinion was that an honours course in a British university is a full-time job, and that additional grants towards expenses would be a sounder way of helping the undergraduate to pay his way than encouraging him to take up bar-tending of an evening. The American medical student presumably has more time for such extras, as he rarely qualifies before 25 or 26. Over here the position is complicated by the Minister of Labour, who will only exempt a medical student from military service if he spend his time in studying medicine.

All the same, I agree with the *Daily Mail* of Nov. 13 that a lot of British medical students are doing spare-time jobs for the sake of the money. It quotes five jobs commonly done—"extra" at film studios; playing in a dance band at night; part-time laboratory assistant; fire-watching on business premises; and selling blood at 2 guineas a pint for research purposes. I know of instances of all the first four, but have not met a case of the last. The average pay for the film work is 30*s.* a day. The work is done on odd days from time to time, and entails being at the studio all day from an early hour. The actual film work occupies a very small part of the day; for the rest you just hang about, and theoretically could do a certain amount of reading. This job is frowned on by the medical-school authorities, and for that reason (plus natural modesty) the student usually avoids the limelight as far as possible while being "shot"; but one or two have become quite well known as film actors. Students playing in professional dance bands are rare but authentic. Part-time assistant in the pathology lab of one's own hospital is quite a common extra job, and is of course a help with one's medicine, though less lucrative than others. Fire-watching on business premises is also common and brings in by far the best money; as much as £7 a week can be earned. Judging each job by the money it brings in and by how little it interferes with one's medicine, I would put lab assistant first, fire-watching second, and film and dance-band work a bad third.

Personally I have plumped for fire-watching. I do 6 nights a week and earn £5. Air-raids are mostly short these days, so I can usually work for 3 hours in the evening and get 8 hours sleep in reasonable comfort. My duties consist mainly in making tea for the compulsory fire-watchers. The reason for the high pay is that in the time of the blitz, when the job was fairly risky, it was hard to get anyone to take it on, and no business now dares to reduce its pay for fear that its fire-watcher will go elsewhere. All the businesses in a block contribute, so the expense does not fall on one concern.

I agree with the Brains Trust that the student should give his time to study, but it does help if one has sufficient money and adequate living conditions. Cheap digs, at any rate in London, are getting scarce; and towards the end of one's time there is the added burden of examination fees, some of which are exorbitant. All in all, I think most of these spare-time jobs are justifiable, and a small minority are almost indispensable.

* * *

"One day last week," says my morning paper, "a lecturer in a London hospital informed his students that it is easier for a midwife to treat pneumonia today than it was for Sir William Osler, 25 years ago." Harley Street, it appears, will soon be only a memory. Fewer and fewer doctors will be required in the next generation. Rheumatic fever is on the decline: sulphonamide drugs reduce its permanent effect on the heart (this, I confess, is a piece of news to me, but newspaper medicine is often a year or more ahead of the profession). I do not think it is going to be as easy as that. I do not think future generations of doctors will find the enterprise of manufacturing chemists providing them with a penny-in-the-slot method of practice, or that their patients will be treated on the cafeteria principle while all they have to do is take the money. For those of us who can count our experience into the fourth decade of practice, and have witnessed much epoch-making advance, recognise that the greater the opportunities afforded by the introduction of instruments of precision, of accessory aids to diagnosis and of potent remedies, the greater the complexity, the greater the need for judgment and discretion.

The public have the impression that all illnesses advertise themselves by unmistakable physical signs and symptoms for which specific remedies are applied. And I am sure it puzzles them why if we wish to find out what is wrong inside the body we don't always X ray and see for ourselves. It would hardly convince them if we tried to explain that so complicated is the human organism, so manifold its possibilities for dysfunction, so utterly inaccessible to the application of rules and regulations, that so far from being surprised when we make errors we are inclined to consider it a miracle that we are ever right. But I suppose on the whole it averages out—the unmerited censure for some perpetration that only a superman could have avoided, and the equally disproportionate approbation for some trifling achievement.

A recently deceased surgeon of international reputation once told me how a patient on whom he had successfully performed a phenomenally brilliant abdominal operation brought his brother in need of surgical attention—removal of a small cyst on an eyelid. "You just did something or other on my guts," remarked the quondam patient, "but you've got to do something really serious this time on my brother's *eye*."

* * *

Overheard through the waiting-room wall. "He said he hadn't got any liver but he'd got two hearts . . ." "George has got them silk-worms again."

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Letters to the Editor

THE CHRISTMAS GIFT

SIR,—As the time for the distribution draws near, once more I would like to remind your readers of our Christmas Gifts fund. Will those who have not yet sent in their contributions please do so as soon as possible. It is my earnest hope that the response to my appeal may be a particularly generous one this year, as it would be such a real act of kindness if we were in a position to give £3 to each of our old people instead of the usual £2.

Please address contributions to the hon. treasurer, Royal Medical Benevolent Fund, 1, Balliol House, Manor Fields, London, S.W.15, marked "Christmas Gifts."

THOS. BARLOW,
President, RMBF.

REPORTING DEATHS TO CORONERS

OBLIGATIONS OF REGISTERED MEDICAL PRACTITIONERS

SIR,—Owing to uncertainty as to the obligations of medical practitioners to report deaths to coroners, the Medical Defence Union and the London and Counties Medical Protection Society have received a number of inquiries from their members as to the legal position. The above-named societies accordingly obtained the opinion of Mr. Roland Burrows, KC, of which the following is a summary authorised by him :—

1. There is no legally enforceable duty resting on a practitioner, acting as such, to report any death to a coroner.
2. The coroner has no power to require a practitioner to report any death to him.
3. It is the duty of the registrar of deaths to report deaths in certain circumstances to the coroner.
4. A practitioner must not do anything to obstruct the coroner in the discharge of his office.
5. A practitioner may make a post-mortem examination with the consent of the deceased's relatives, whether or not he knows the cause of death, unless by so doing he knowingly hinders the coroner in carrying out his duties; but, as soon as it comes to the knowledge of a practitioner that the coroner has been informed from any source touching the death, on no account should any examination of the body be made without instruction from the coroner.

We have stated above the legal duties of practitioners, but they, like other members of the community, have social, public and moral obligations not enforceable by law to assist coroners. It is important that practitioners and coroners should collaborate harmoniously for the public good, and it is hoped that every practitioner will refer to the coroner any death respecting which he feels any doubt.

A copy of Mr. Burrows's opinion, upon which the above is based, can be obtained by members on application to the Secretary of the Medical Defence Union (49, Bedford Square, London, W.C.1), or of the London and Counties Medical Protection Society (Victory House, Leicester Square, London, W.C.2).

JAMES FENTON,
President, Medical Defence Union.
CUTHBERT WALLACE,
President, London and Counties Medical Protection Society.

STERILITY AND IMPAIRED FERTILITY

SIR,—The only point at issue between your correspondents is the relative importance of voluntary and of involuntary sterility as causes of the decline in the population. The writers of the first letter after a preliminary and confessedly limited investigation of the subject have reached the conclusion that involuntary sterility is a more important factor in the decline than was previously supposed, whereas the writers of the second letter are inclined to disagree with them. All signatories are, however, in agreement that every aspect of this important subject must be fully investigated. It is certainly true that no authoritative pronouncement on this question can be made until much more evidence becomes available and that valuable data would be derived from census inquiries. It was with the object of calling wider attention to the need for a complete and searching investigation of the causes—economic, biological and pathological—of the decline in the population that the earlier of the two letters was written. We are therefore grateful for the support given by the signatories of the second letter to the need for this investigation even though they are of the opinion that the economic causes are of greater importance than the factor of involuntary sterility.

KENNETH WALKER
Chairman of the Subfertility Conference.

British Social Hygiene Council,
London, W.1.

PATULIN IN THE COMMON COLD

SIR,—With regard to the papers published in your last issue by Prof. H. Raistrick and his collaborators on the use of patulin in the treatment of the common cold, we wish to record that a laboratory and clinical investigation has been carried out under the auspices of the Director of Pathology, the War Office, on a sample of the substance which was received by courtesy of Professor Raistrick in March, 1943.

We were able to confirm in general the bacteriostatic activity and the lethal dosage for mice found by Surgeon Commander W. A. Hopkins and described in his paper.

A preliminary trial of the use of patulin in the treatment of the common cold was carried out in March, 1943, at a primary training wing, but the results were not convincing. A further trial was begun in August, 1943, at a different primary training wing, and in this trial the method of application was modified to conform with that used by Surgeon Commander Hopkins. One hundred cases were treated during August and September, and alternate cases received patulin and the control solution of phosphate buffer saline. The series was carefully analysed, and the treated and the control groups were found to be closely comparable as regards symptoms, average duration of the cold before treatment, and bacterial flora of the nasal secretion. All cases were afebrile. The proportion of cases which showed clinical improvement was substantially the same in both groups, as was the number of patients who considered that treatment had caused their colds to improve.

We had to conclude that patulin had no demonstrable effect on the course of this series of colds as compared with the natural evolution of the disease. A full report is being prepared and will be submitted to the Director of Pathology, the War Office, in due course.

C. H. STUART-HARRIS.
A. E. FRANCIS.
J. M. STANSFELD.

MYASTHENIA GRAVIS

SIR,—In attempting to explain the improvement in myasthenia gravis which may follow extirpation of the thymus gland, Laurent (*Lancet*, Oct. 23, p. 525) postulates latent tetany following accidental removal of the parathyroids. While the chance removal of the lower parathyroid bodies may remain a practical issue, it seems questionable whether total parathyroidectomy can occur fortuitously in the course of thymectomy on account of the high situation of the upper parathyroids and the not uncommon presence of accessory tissue. Unless extirpation is complete, the remaining parathyroid tissue will undergo a compensatory hypertrophy until a state of secretory balance is once more attained and any effect produced by the operation would be lost. Concerning the value of latent tetany in overcoming the myasthenic complex, the possibility of a heightened excitability of the motor apparatus achieving some measure of success in counteracting the functional myoneural disability may appear feasible in theory, but against this it should be remembered that the clinical manifestations of tetany are often ephemeral even in face of the strictest excision of parathyroid tissue which can be accomplished experimentally. In spite of a persistently low serum calcium, the motor hyperexcitabilty subsides and the symptoms of tetany disappear. Hence any improvement in the myasthenia if due to this cause would probably be short-lived.

In assessing the mechanism and basis of treatment of myasthenia gravis, two circumstances should be considered. First, that myasthenia is a symptom and not a disease. Its presence forms an indication usually of a facilitation of the choline esterase process at the

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myoneural junction but may also be related to some alteration in response to stimulation of the muscle-fibre or its motor end-plate. Second, arising from the first, is the fact that several undifferentiated varieties of myasthenia exist, the anomaly being due to the circumstance that myasthenia, whatever its origin and nature, will always present a clinical picture possessing certain common characteristics. I directed attention to these points at a meeting this year of the Ophthalmological Society. Thus the myasthenia of Graves's disease, although essentially thyrotoxic in nature as it is cured by a thyroidectomy or improved during a remission of the illness, is commonly spoken of as myasthenia gravis complicating exophthalmic goitre. Again, the development of a myasthenic syndrome in connexion with thymic tumour has led to the belief that thymic activity is closely related to the pathogenesis of myasthenia gravis. Evidence on this point is weak, being about on a par with that favouring thyroid activity as a causative agent on account of the occurrence of thyrotoxic myasthenia. Further, curare and like substances can induce an accelerated type of muscle weakness resembling myasthenia gravis in all aspects, save that of speed of development, and capable of neutralisation by prostigmine although the operative mechanism seems to be slightly different. Lastly there is myasthenia gravis, a condition whose pathogenesis, although shrouded in mystery, remains distinct from those described above. Concerning the value of thymectomy for myasthenia gravis, it is evident that the operation forms the correct treatment for thymic myasthenia in the same way as thyroidectomy remains the proper measure for thyrotoxic myasthenia. Both these operations however might be expected to exert a beneficial effect on myasthenia gravis, the probable rationale being, as with the improvement in certain forms of cardiac disease following total throidectomy, the removal of a substance which gives rise to deleterious effects on the organ concerned when present in abnormal quantities. But on account of this associated benefit it would be unwise to regard the phenomenon as being indicative of a causal relationship and still more so to accept all expressions of the myasthenic complex as being instances of myasthenia gravis without more concrete evidence to that effect.

London, S.W.3. JOHN H. MULVANY.

DOMESTIC SERVICE IN HOSPITALS

SIR,—The two principal general hospitals in Bristol—the Bristol Royal and Southmead (Municipal) Hospitals—seem to suffer less than most from the prevailing shortage of domestic workers, though there have been times when everybody has had to turn to. The two matrons give almost identical reasons for their immunity, and these reasons may be instructive.

Miss Bell (Royal Hospital) spoke of the personal interest taken in the domestic staff and the stress laid on the importance of their work to the institution. The domestic staff, she said, are taught to regard their job as the foundation on which the whole hospital work is built up. As regards rates of pay, the daily workers receive the rates of the Transport and General Workers Union. For resident maids there is no standard union rate, but an effort is made to keep wages as nearly as possible in conformity with trade-union practice; thus after age 18 no experience is required to entitle a girl to receive adult wages. Of course wages rise with length of service at the hospital. As in the case of nurses there are, or were before the war, differences in the uniform marking seniority both in length of service and in the appointment held. For instance, after 2 years service a green frock was worn. A badge was given after 5 years, and the presentation of badges was always made on some ceremonial occasion, such as the Lord Mayor's visit at Christmas. There has been a money gift as recognition of long service in addition to the normal rise in wages. Long service is fairly common—there are five maids with more than 14 years service. Hospital work has not so far come under the Essential Work Order except in the case of laundry workers. Any other woman may leave her job if she wishes, but there has not been any great tendency to leave for factory work or the Services. Miss Bell has welcomed part-time voluntary workers and says that special arrangements and a good deal of tolerance are needed to use such work to full advantage. The residential accommodation is very good. The maids' hostel stands in the really beautiful grounds of the nurses' home. It was once part of the monastery of the Black Friars and occupies the site of the monks' vineyard, one of the best sites in our city. The hostel is a modern building erected for the purpose. Actually the accommodation is better, because we learn by experience, than that of the nurses' home. The Royal Infirmary is in the centre of the city and amusements are near at hand as well as bus services in all directions.

Miss Webber (Southmead Hospital) put first among the reasons the status and consideration given to her domestic workers. Here again there is no union rate of wages but the wages are high, among the highest paid in the whole country. The women are allowed freedom. They are given passes just like nurses. The off-duty times are generous—one whole day a week, a half day on alternate Sundays, and one or sometimes two evenings a week. Their dress is smart and there are distinctive differences according to length of service and the appointment held. The residential quarters are not so modern and up to date as could be wished but this is because the war has held up all building plans, but there is a hall for entertainments and they have occasional dances with a good dance band. The situation of the hospital, although towards the outskirts of the city, is agreeable, and three of the best cinemas are within easy walking distance. I am not sure whether the proximity of the barracks is altogether a disadvantage. About half the girls come from Bristol and about half from Wales. No hospital badge is awarded to the domestic workers but they are corporation officials and may wear the municipal badge from the time they join the staff.

Another factor which both matrons feel plays no small part in the favourable position which their hospitals enjoy is Bristol's well-marked local attachment, sentiment or patriotism. J. B. Priestley recognised this when he described Bristol as being the only real provincial capital in England. He was right—there is a feeling here, and I speak as an intruder, of being in a metropolis or mother-city. This self-sufficiency may be deplorable to some minds but it certainly makes Bristol a centre of attraction for a large area in the West of England and a good portion of Wales.

Bristol. J. A. NIXON.

PRIMARY ATYPICAL PNEUMONIA

SIR,—The paper by Drew, Samuel and Ball in your issue of June 19, while drawing timely attention to a condition which must often have been unrecognised, contains statements on the radiological side which should not be allowed to pass unchallenged. On p. 763 it is noted that "enlargement of the hilar shadows was observed. . . . This has the characters of enlarged glands—namely a shadow with an ill-defined outline and translucency of the normal hilum." It has surely been proved by now that hilar glands play little if any part in the formation of the hilar shadow, and that where they do play a part it is impossible to separate them with certainty from the extremely variable vascular shadows of the hilum; only where a gland is sufficiently enlarged and sufficiently favourably placed in relation to vascular shadows to show a well-defined border (not "an ill-defined outline") by contrast with aerated lung can it be interpreted as such radiologically. This has been clearly brought out by Lopo da Carvalho in his studies by angiopneumography.[1]

How dangerous it is to interpret hilar shadows as enlarged glands is illustrated in one of the cases presented by the authors. In case 4, it is stated that on March 4 (fig. II) the left hilar glands were moderately enlarged. Eleven days later "the hilar glands were still enlarged but less than in the previous film" (fig. III). On comparison of figs. II and III there is certainly a difference in the hilar shadows but the difference is in size and density rather than in contour, and the shadows can be resolved into those of pulmonary branches; on close examination fig. II bears all the characteristics of a film taken (I suspect with a portable apparatus) at a short distance in an anteroposterior direction—namely, relatively broad heart, sharply defined posterior rib margins, and relatively enlarged anterior rib shadows

1. da Carvalho, L. and Moniz, E. *Acta radiol., Stockh.* 1933, 14, 433; da Carvalho, L. Report to Medical Congress of Lourenço Marques, Lisbon, 1938.

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with ill-defined margins; while fig III is obviously a postero-anterior radiogram taken as a teleradiogram. Such differences in technique would explain the differences in the appearance of the hilar shadows.

I am aware that it is claimed that adenopathy can be diagnosed from lateral radiograms, but I have not been able to satisfy myself that it becomes easier to separate the glands from the vascular shadows by superimposing the hila of the two sides.

Military Hospital, Wynberg, Cape Province, S. Africa. STEPHEN MONTGOMERY.

OPINION OF SERVING DOCTORS

SIR,—Since the earlier part of the war discussions have been taking place as to the future of medicine. Up till the present time only members of the profession at home have had an opportunity of stating an opinion. There may be a vast difference in the outlook of a doctor engaged in an appointment or a practice which will continue at the end of the war, and a service doctor who will have to make a fresh start. In our opinion the latter has been utterly and completely ignored up to date. It is said that when the time comes machinery will be set in motion for communicating with Service men and women whose views cannot be obtained through the normal channels.

It is perhaps not realised that replies may take several months. In our opinion a questionnaire should be sent out without any further delay to *all* members of the profession. It should be drawn up jointly by representatives of the profession and the Ministry of Health setting forth the points of difference. These should be voted on by ballot, and the results assessed.

By airgraph. E. R. VAN LANGENBERG.
T. S. STEWART.

CONTRACTING OUT

SIR,—Your three correspondents, in their letters of Oct. 30, appear to suppose that I am making a case for the discontinuance of private practice, if not for the actual inauguration of a state salaried service. This is not so. What I am at pains to point out is that *if*—and this is by no means unlikely—a comprehensive medical service available to the *whole community* comes into being, then we must be prepared to forgo private practice. If on the other hand the service is only designed to cover people up to a certain income level, the question of contracting out would hardly arise at all, because the great majority of those who would want to, and could afford to, contract out would find themselves not covered by the scheme.

I agree thoroughly with Dr. Nelson when he says that we cannot run with the fox and hunt with the hounds, but I certainly do not conclude that all must be of the state. To try another metaphor, you cannot have your cake and eat it, and if, as seems plain, the majority of the profession is against a full-time salaried service, we have the choice of some other type of service which should either be (*a*) universal, or (*b*) limited, with other means of remuneration. From the experience of a series of (so far) 17 public relations meetings with various lay audiences, I believe that what the public wants, if there is to be any change at all, is a universal service. To compromise with any mere extension of National Health Insurance to a higher income level seems merely to perpetuate all the disadvantages of the present panel system, and I am sure that the public at least see in this proposal the danger that Dr. Leak is afraid of—that there will be a levelling down instead of a levelling up.

Dr. Lindsey Batten gives several legitimate reasons for a patient wishing to step outside an official scheme. I am bound to say I see no reason why a patient should not be able to obtain all these attentions in a comprehensive service run by the state. The reason why the doctor can only give the young mother two minutes at the clinic is usually because he has a good deal to get through in a fairly short time, and simply cannot afford to give her any more. Surely one of the first objects of any organised service would be to ensure that the doctor who was running the clinic would be able to give each patient sufficient time to attend to his or her medical needs. And the point about health centres. It would obviously be impossible to be too rigid about these, and I see no reason why a doctor should not on occasion visit his patient's house for an interview which is perhaps not entirely necessary on medical grounds. And where the visit was made to the health centre, there is no reason why this should not be made at the mutual convenience of the patient and doctor, there being no reason why, if an appointment has been arranged, the patient should waste valuable time waiting about.

The whole thing in my view boils down to whether we are going to provide a medical service for 100% of the population or only a proportion of it. At the Annual Representative Meeting of the BMA in 1942 the former was approved by a hairsbreadth majority, but last September a motion was passed by a large majority which very nearly negatives this decision. It is unfortunate that there should seem to be a divergence of opinion on such a fundamental point. I believe that if we provide for only a proportion we shall lay ourselves open to the possible criticism that we wish to make as much as we can out of that section of the population not covered by the national scheme.

I do hope that a good deal more thought will be given to the 100% issue before we come to a final decision in the matter, and that if the eventual decision is in its favour, as much thought will be given to the inadvisability of contracting out.

Eastbourne. A. LUCAS YOUNG.

Obituary

LOUISA GARRETT ANDERSON

C B E, M D LOND

Dr. Louisa Garrett Anderson died at Brighton on Nov. 15 in her 71st year. She was the firstborn of Dr. Elizabeth Garrett, who married the shipowner James George Skelton Anderson in 1870 when she was 34. From the chance meeting with Elizabeth Blackwell in 1859 that turned her thoughts towards medicine, to her qualification as an Apothecary in 1865 and the Paris doctorate in June, 1870, her mother's life had been one long hard-won campaign for women's rights, but as Louisa says in her filial memoir: "No one can remain 'the stern pioneer,' at any rate in her own home, if, when she gives herself airs, she is laughed at—and loves it." Jamie did not understand jealousy; he delighted in her position, her success and her achievement: her cause in fact became *their* cause. It was into such a home that Louisa was born in 1873 and after the death of a sister from tuberculous peritonitis at the age of fifteen months she shared it with her brother Alan, in whose life hospitals came to compete with shipping in absorbing interest, while the perfect Banffshire "Aaa" reigned in the nursery releasing their mother to her growing practice and to serve the Hunter Street school as dean for two decades. Later she was sent to school at St. Leonards, Fife, returning to the Royal Free from which she qualified MB Lond. in 1897. House appointments there and at the "New" (Eliz. Garrett Anderson) Hospital followed and after some foreign travel she took her MD and started consulting work, seeing outpatients at the New Hospital and the Harrow Road children's hospital. She had many friends and lived a very full life; and then, true to type, she gave herself selflessly to the militant suffrage movement, serving a term of imprisonment.

The first world war closed this chapter and on Sept. 14, 1914, she went with the first unit of medical women for service in France. This unit was attached to the French Red Cross, and when they arrived in Paris they were sent to Claridge's Hotel, which had just been emptied so that the Women's Hospital Corps might be housed. It had to be surgically cleaned from top to toe, but within a few hours of the unit's arrival French wounded were being brought in straight from the battlefields, and Dr.

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Louisa was operating in one of the bathrooms. Later in the war she was chief surgeon to the Military Hospital, Endell Street, and in 1917 was awarded the CBE. Soon after the armistice she retired to Penn, Buckinghamshire, where she became a JP and interested herself in local affairs.

Immediately this war broke out she left her much-loved home to come to London. She felt that she must be in touch with the stress and strain of war, and wished, in particular, to be near the hospital founded by her mother, so that she might offer it any help which was in her power to give. She got to know every individual in the hospital and identified herself with every aspect of its life—domestic, administrative, nursing and medical. When the bombing started, even if she were not working in the hospital during the raid, she would appear a few minutes after the all-clear, just to see that all was well and to wish everyone God-speed. In thinking of her, the words courage, integrity and humour come to mind, and the many friends who will miss her will never forget these, her outstanding qualities.

JANSEN OSWALD DAVID WILLIAMS

M B CAMB.; CAPTAIN RAMC

Jansen Williams matriculated at the Cardiff High School when he was fourteen, and was at Cambridge before his seventeenth birthday. But if he was some years younger than his fellows, they were kept in the dark about it. His powers of application at work were not extreme, but he could learn much in the limited time he allowed himself. He played rugby football, as all good Welshmen do, and represented his school, college and hospital at the game. "Jod" entered St. Thomas's Hospital in 1937 with many of his friends. He found no difficulty with the clinical side of medicine and once remarked that one could glean enough from the lunch-time talk to see one through. He qualified in 1940 and took his Cambridge degree the following year. He held a job at Farnham County Hospital for six months when he volunteered for the Navy, but, as with so many, found himself attached to a regiment. He married during his period of service at home, and went abroad with a general hospital in October, 1942. He was one of the first medical men to land in N. Africa. After a short stay at the base, he moved to the fighting line, and remained with an advanced field ambulance during the Sicilian and Italian campaigns. He was killed in action last month.

Keturah Collings

H. B. L. W.

DR. ERIC PRITCHARD

ALL Eric Pritchard's friends must be grateful, writes H. W. C., for your sympathetic obituary notice. He may certainly be said to have been the originator of the infants' charter. One of the things not mentioned seems to warrant a further note. Pritchard made the really astounding discovery that neonatal fractures of long bones require no treatment of any kind. Travelling up to Paddington from Burnham he told me the following story.

An infant victim of fragilitas ossium was found to have 29 fractures. Obviously no splinting or other local treatment was possible. After a few months all bones were found to be completely normal. Pritchard then produced a series of X rays of an infant's untreated fracture in the middle of the femur—great shortening of the limb had occurred as the broken shaft was crossed and the ends inches apart. The second picture showed nothing but a huge mass of callus. In later ones the callus gradually thinned and from its centre there finally emerged a perfectly healthy normal femur. After this experience no natal fractures received treatment of any kind.

The UNITED AFRICA Co. Ltd., of Unilever House, Blackfriars, E.C.4 have a small supply of dried bananas, imported from the British Cameroons. They are willing to send a box to any hospital which urgently needs bananas for the treatment of cœliac disease.

Notes and News

A NEW LINK WITH THE USSR

THE Anglo-Soviet Medical Council was founded in 1941 and has contributed much to the steady growth in understanding between Russian and British scientists and medical men. Now a sister body has been formed in the United States which like the ASMC is designed for the exchange of medical information. The American-Soviet Medical Society, through meetings, by means of a journal, and by setting up a library of information, will tell doctors and members of allied professions in America on what problems the Russians are working and how they are solving them. The society will also be sending medical books and periodicals to the Soviet, and will help to develop closer coöperation between the Russian and American medical corps. When conditions allow, plans will be made to exchange students and scientists, and to arrange study tours in the two countries. All American doctors and those engaged in allied professions are invited to become members. The journal, to be called the *American Review of Soviet Medicine*, will be edited by Prof. Henry E. Sigerist, author of *Socialised Medicine in the Soviet Union* (1937). The president of the new society is Dr. Walter B. Cannon.

University of Cambridge

On Nov. 19 the following degrees were conferred:

MD.—*D. D. Evans, *E. T. D. Fletcher, J. B. Murray.

MB, B Chir.—F. M. Deighton.

Socialist Medical Association

The central London branch of this society is holding its first meeting at 8.15 PM, on Monday, Nov. 29, at the Conway Hall, Red Lion Square, W.C.1, when Dr. Philip Inwald will speak on socialism and medicine.

Glucose Tablets for Hypoglycæmia

Glucose in tablet form is now available in sufficient quantity to meet the demand by diabetic patients. The Ministry of Health, in coöperation with the Directorate of Medical Supplies, have arranged for a special allocation of glucose to go to the manufacturers of these tablets. Ample supplies are available so long as the distribution of these tablets is confined to the diabetic members of the public, and to a great extent this responsibility lies with the retail chemists through whom the distribution will be made.

Insulin Colour Code

Three distinct types of insulin are now in regular use—unmodified insulin, protamine zinc insulin and 'Globin insulin (with zinc).' Alternative strengths of two of these make a total of six different preparations. To reduce the chances of confusion to a minimum British manufacturers have agreed to adopt a uniform design for labels and cartons, by which each type and strength of insulin, of whatever make, will be readily identifiable by a distinctive colour scheme. In addition, the unit strength per c.cm. will be stated in bold figures on both label and carton. An explanatory card can be obtained from any of the manufacturers, Allen and Hanburys Ltd., Boots Pure Drug Co. Ltd., British Drug Houses, Ltd., or Burroughs Wellcome & Co.

Royal Society of Medicine

At the meeting of the section of medicine at 2.30 PM, on Wednesday, Dec. 1, the third centenary of the publication of the *Religio Medici* will be commemorated. Dr. H. P. Bayon will also give some personal recollections of Robert Koch who was born on Dec. 11, 1843, and Dr. Douglas Guthrie will read a paper on Andrew Boorde (1490–1549) physician, priest and traveller. At 5 PM, on the same day at the section of surgery Mr. A. Rainsford Mowlem, Mr. P. H. Jayes and Dr. Peter Gabarro will open a discussion on modern methods of skin grafting. On Dec. 3, at 10.30 AM, at the section of otology Air-Commodore E. D. D. Dickson, Squadron-Leader J. E. G. McGibbon and Squadron-Leader Colin Campbell will describe a clinical and experimental investigation of acute otitic baratraums. Major E. P. Fowler, USAMC, will also speak on the prevention of otitis due to otitic baratraum with radon. On the same day, at 2.30 PM, at the section of anæsthetics Dr. I. W. Magill will ask: Is a Proper Perspective being Lost by Anæsthetists Today? At the same hour, at the section of laryngology, Major Freda Bannister and Mr. G. Ewart Martin will open a discussion on local regional anæsthesia in nose and throat operations.

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Medical Casualties

The following RAMC officers have been posted as prisoners of war: Captain W. R. Jackson, MB LEEDS; Major J. R. Macdonald, MB EDIN.; and Major P. E. F. Routley, BM OXFD.

Medical Honours

The following awards have lately been made to RAMC officers:

DSO.—Colonel Malcolm MacEwan, DFC, MD.
During continuous dive-bombing of an advanced dressing-station although all ranks were ordered to take cover Colonel MacEwan remained at his post, attending seriously wounded cases. His devotion to duty and complete disregard of personal safety was an example to all ranks.

MC.—Major M. E. M. Hereford, MB BRIST., Captain B. E. W. Aldwell, MB DUBL.; Captain J. S. Martin; Captain Jan Miedema, MB EDIN.

Training for Maltese Specialists

As a tribute to the courage and endurance of the people of Malta, the Nuffield Foundation have, with the approval of Lord Nuffield, offered to provide grants for the training in Great Britain of six Maltese doctors, chosen by the government of Malta, for the following appointments in the public service of the island: orthopædic surgeon or assistant orthopædic surgeon, radiologist, tuberculosis officer, two infant welfare officers, and a medical officer to undertake the medical care of the civil prison and reformatory. The grants will be tenable for a period not exceeding 2 years. The men or women who are chosen will receive a grant of £400 per annum if unmarried, and £600 if married and a further allowance in travelling expenses. The recipients will be required to give an undertaking to return to the island at the end of their training to take up the appointment for which they have been selected. The institutions in which they will receive their training will be chosen by the trustees of the foundation in consultation with the Colonial Office.

Care of Disabled in Birmingham

A Birmingham Welfare Council, dealing with the training and employment of disabled persons, has been set up in Birmingham on the initiative of the City Reconstruction Committee. At the first meeting, held on Nov. 18, Alderman Norman Tiptaft, chairman of the Reconstruction Committee, said that "the primary aim of the organisation is to ensure that no Birmingham citizen in need of help of any sort on account of injury should be neglected." It might establish a central office, staffed by trained people who could act as skilled advisers to the disabled; it might arrange a scheme for pooling the local-authority and the national statutory organisations in providing workshops similar to those of the Lord Roberts Memorial Fund; it might set up a large central institution for training partially disabled persons and extend the work of cripples; and it might use its influence to secure jobs for disabled persons in both industrial and commercial life. Birmingham agencies concerned in the welfare of disabled persons had produced various suggestions, and this made it more than ever necessary to have a unified council which would prevent overlapping.

Major Llewellyn Ryland, a member of the board of the Royal Cripples Hospital, was elected chairman.

". . . I would like to see every anthropological department with its laboratory attached, or at least in very close working relations with suitable laboratories in other departments. There the student will learn, by practice, the experimental basis of evidence; the controls that are necessary and possible in the comparative study of smallish groups; and whatever equipment of tests is going to help him along his special line of interests. There it might be possible to develop those beginnings of the experimental study of social thinking, and of group leadership, that have already appeared. There could be worked out ways of showing how the basic functional measures of which I have spoken do actually affect the sort of behaviour in which the anthropologist is interested. There perhaps concrete and controlled demonstrations could be achieved of some of the effects of propaganda, and of some of the conditions of the spread and change of public opinion. Nobody can tell how much can be accomplished, for nobody has seriously tried".—F. C. BARTLETT, FRS, giving the Huxley memorial lecture on Nov. 23.

The Minister of Health has appointed Sir Edward Campbell to be parliamentary private secretary, Mr. Michael Reed to be his private secretary, and Miss L. R. Prescott to be his assistant private secretary.

Infectious Disease in England and Wales

WEEK ENDED NOV. 13

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 3236; whooping-cough, 1902; diphtheria, 819; paratyphoid, 4; typhoid, 5; measles (excluding rubella), 557; pneumonia (primary or influenzal), 781; puerperal pyrexia, 158; cerebrospinal fever, 41; poliomyelitis, 20; polio-encephalitis, 2; encephalitis lethargica, 1; dysentery, 158; ophthalmia neonatorum, 89. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Nov. 10 was 1894. During the previous week the following cases were admitted: scarlet fever, 202; diphtheria, 54; measles, 8; whooping-cough, 49.

Deaths.—In 126 great towns there were no deaths from enteric fevers or measles, 1 (0) from scarlet fever, 7 (0) from whooping-cough, 13 (1) from diphtheria 64 (7) from diarrhœa and enteritis under two years, and 46 (6) from influenza. The figures in parentheses are those for London itself.

Bristol and Manchester each had 4 deaths from influenza, Liverpool reported 10 fatal cases of diarrhœa, Birmingham 6.

The number of stillbirths notified during the week was 199 (corresponding to a rate of 32 per thousand total births), including 23 in London.

Births, Marriages and Deaths

BIRTHS

BELL.—On Nov. 12, at North Shields, to Dr. Jean M. Bell (née Cass) wife of the Rev. R. G. Bell—a son.

CURWEN.—On Nov. 13, in London, the wife of Surgeon Lieut.-Commander Montague Curwen, RNVR—a son.

DICK.—On Nov. 21, at Oxford, the wife of Dr. W. Pointon Dick—a daughter.

FOOTE.—On Nov. 21, at Horsell, Woking, the wife of Surgeon Lieut.-Commander E. S. Foote, RNVR—a daughter.

RIDLEY.—On Nov. 20, at Woking, the wife of Major N. H. L. Ridley, RAMC—a son.

WAINWRIGHT.—On Nov. 17, at Hartshill, Stoke-on-Trent, the wife of Mr. Denys Wainwright, FRCSE—a son.

WILLCOX.—On Nov. 20, at Windsor, the wife of Major Philip Willcox, RAMC—a son.

MARRIAGES

KNOWLES—JAMES.—On Nov. 20, at Woking, James White Jackson Knowles, surgeon lieutenant RNVR, to Anne James.

MARTIN—STEWART.—On Nov. 11, in London, Thomas Dawson Masson Martin, MRCS, to Eileen Hannah Stewart.

DEATHS

BATES.—On Nov. 21, at Worcester, Tom Bates, FRCS., aged 65.

BURTON.—On Nov. 16, at Spalding, Lincs, Wilfred Robert Burton, LRCPI,

HARDY.—On Nov. 15, Edward William Dacre Hardy, MC, MRCS.

LESLIE-SPINKS.—On Nov. 18, at Woolacombe, N. Devon, Charles Frederick Leslie-Spinks, LRCPE, formerly of Bournemouth.

MATTHEWS.—On Nov. 12, in London, Guy Matthews, MB LOND., aged 56.

MICHAEL.—On Nov. 20, at Harrow Weald, Cyril Eden Michael, MB CAMB.

MOORE.—On Nov. 18, at Duckyls, near East Grinstead, Frederick Craven Moore, MD MANC., FRCP, aged 71.

PARES.—On Nov. 17, at Woking, Basil Pares, CMG, DSO, MRCS surgeon lieut.-colonel, late 1st Life Guards, and Royal Horse Guards, aged 74.

PARSONS.—On Nov. 17, Gerard Lyne Parsons, MRCS, of Radlett, Herts.

ROGERS.—On Nov. 16, at Yelverton, George Frederick Rogers, MD CAMB.

SPENCE.—On Nov. 14, Arthur Dunbar Spence, MB EDIN., of Harpenden, formerly of Rangoon.

WHILLIS.—On Nov. 20, Robert Whillis, MB CAMB., FRCSE.

A SHORT schedule of amendments to the BP 1932 contains only one addition to the monographs—a liquid extract of colchicum corm, which will replace the ordinary liquid extract made from the seed. The colchicine content of the new extract is the same as of the old—gr. 1/70 per min. 5. Tincture of orange can now be omitted from confection of sulphur.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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MOBILE NEUROSURGERY IN WARFARE

EXPERIENCES IN THE EIGHTH ARMY'S CAMPAIGN IN CYRENAICA, TRIPOLITANIA AND TUNISIA

KENNETH EDEN,* M.S. LOND., F.R.C.S.
MAJOR R.A.M.C.; O/C A MOBILE NEUROSURGICAL UNIT

THE recent campaign of the Eighth Army from El Alamein to Tunis was unprecedented in the rapidity of its movement and the length of the lines of communication. It provided unique problems in the treatment of war wounds of the head.

Until after the battle of El Alamein neurosurgical battle casualties had been evacuated to a base neurosurgical unit by air, either untreated or after operation by the general surgeons in the field. As the enemy began to move rapidly westward, however, the problem of transporting these cases to the base became more and more difficult, and eventually a mobile neurosurgical unit was sent into the field. Throughout the remainder of the campaign this unit worked with a casualty-clearing station (CCS), usually the most forward one, and cases after operation were evacuated by air to the base. When this became too distant for one journey a detachment of the unit was left in a hospital on the line of communication to act as a staging post. This advanced base team was able to hold and nurse the cases operated on by the forward team until they were fit for the second and longer air journey to the base, while at the same time it collected the cases missed by the mobile team. Thus a specialised head-injury service was provided from the forward CCS to the base at Cairo—eventually a distance of some 2000 miles.

Equipment.—The team was equipped with a complete set of neurosurgical instruments, including electric suction and diathermy,[1] and after some experimentation a satisfactory operating-theatre was constructed out of a derelict 10-ton Diesel motor-coach captured from the Italians (fig. 1). Lighting was provided from batteries which could be recharged by running the engine, and a special fitting in the ceiling of the coach provided for a head-light.

The petrol generator carried by the unit was arranged to run outside the coach, with leads to the suction and diathermy machinery and for emergency lighting. A rear compartment was fitted with instrument and linen cupboards and running water for scrubbing up. Altogether it formed a compact and well-equipped, relatively dust-proof operating theatre that could be packed up and moved in an hour or two.

Routine Treatment

During the battles cases were received in a steady stream in the CCS by motor ambulance convoy from the field ambulances. The head cases were sorted out and admitted direct to a tented neurosurgical preoperation ward attached to the operating-theatre. Here preoperative investigation and treatment were carried out, and sometimes as many as a dozen cases would be waiting for operation at one time.

SELECTION OF CASES

In general, open brain wounds took precedence over simple depressed fractures and scalp wounds, many of which were evacuated straight on by air to the advanced base team. But we soon learnt to regard coma as a grave prognostic sign in brain wounds and to leave these cases for some hours, the better to assess their chances while we made sure of the simpler cases. Table I shows the mortality of the head wounds (other than scalp wounds) classified in terms of their degree of consciousness.

TABLE I—MORTALITY RELATED TO STATE OF CONSCIOUSNESS

—	Coma	Semi-coma	Confusion	Alert
Number of cases dying..	12	7	4	1
Number of cases surviving	3	6	23	115

The presence of neurological signs was not considered to exclude a good result, and many of these patients made a complete recovery, while almost all of them improved considerably.

The presence of other associated injuries is always a difficulty in specialised war surgery; in some of these cases we worked together with the general surgeons, while at other times we treated the other wounds ourselves. Shock, which is usually an unimportant feature in head cases, may then be a prominent symptom; blood or plasma transfusions must be set up and operation may have to be delayed. In 90 out of 325 of our cases of head injury there were wounds elsewhere in the body. One of the more important associated wounds is injury to the eye, of which there were 19 cases in our series. What appears at first sight to be a pure orbital wound and is referred to an ophthalmic surgeon is sometimes a perforating brain wound. For this reason we always worked in liaison with the ophthalmic surgeon.

PREOPERATIVE MEASURES

Most of the cases reaching us had had no treatment other than a dressing to the wound of sulphanilamide powder and sulphanilamide given orally or sulphadiazine intravenously. A few cases had been operated on further forward, and in some of these we reoperated before passing them on.

The two most important diagnostic procedures are a complete neurological examination and radiography of the skull, both of which were carried out as a routine. Lumbar puncture is not informative enough to justify its use in the investigation of early brain wounds; it only becomes important in the later stages.

The next step, and usually a formidable one, is to shave the head. The importance of this cannot be overstressed, for in the desert the soldier's scalp is far from clean. If the hair is first cut short all over with scissors, and the wound edges are left to the surgeon to shave, the task is simplified. We always insisted on the orderly wearing a mask to avoid adding to the wound flora.

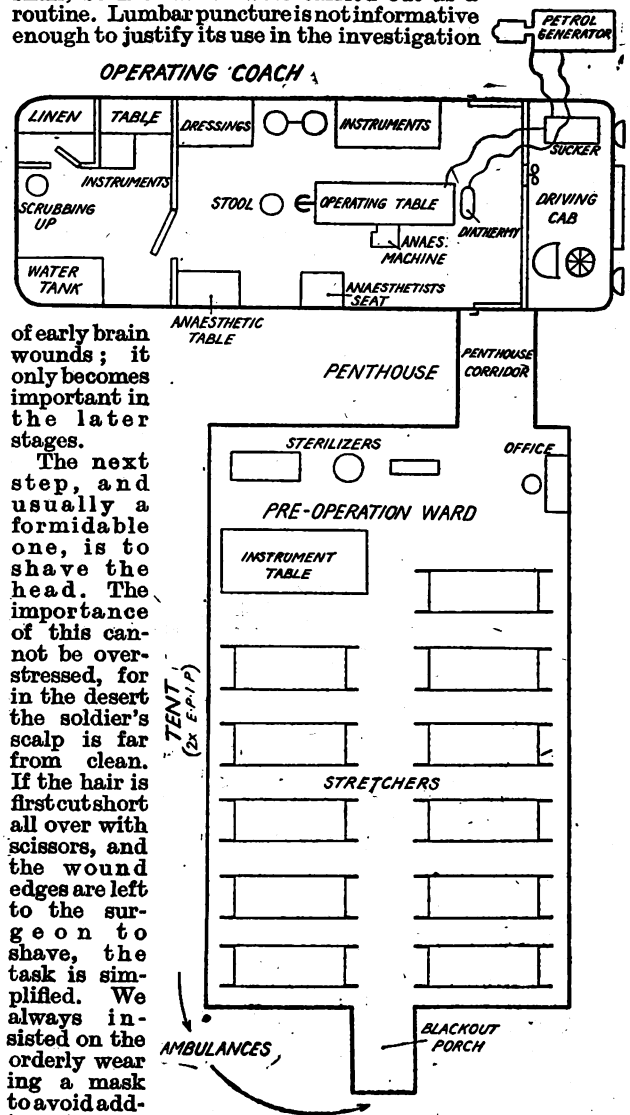

Fig. 1—Ground plan of operating theatre in motor coach, and of attached pre-operation tent.

* Major Eden's death on active service was recorded in our issue of Nov. 20 (p. 653).

1. *Brit. med. J.* 1940, i, 661.

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TABLE II—HEALING RELATED TO AGE OF WOUND

Age of wound on admission	Total	Healing: 1st intention	Infections	Primary healing (%)
24 hours	188	173	15	92·0
48 hours	40	39	1	97·5
72 hours	31	27	4	87·1
4 days	17	15	2	
5 days	9	7	2	
6 days	3	—	3	
7 days	2	2	—	
8–10 days	3	3	—	
Total ..	293	266	27	

ANÆSTHESIA

More and more as the campaign went on we came to rely on local anæsthesia given in the form of a regional block of 1% 'Novutox' with a basal narcosis of omnopon (gr. 1/3) and scopolamine (gr. 1/50). Usually this was sufficient alone, and the criticism that it is too exacting for the battle casualty was not borne out by the testimony of our patients. The contra-indications were wounds involving the eyes or ears, in which a satisfactory regional block could not be obtained, or patients in a state of uncontrollable restless confusion. It is just these latter cases which provide the biggest problem in smooth general anæsthesia, but this was always provided by Major R. P. Harbord, using endotracheal cyclopropane following induction with a small dose of 'Pentothal,' or by a continuous drip of ½% pentothal solution.

TABLE III—PRIMARY OPERATIONS

Type of case	No. of cases	Deaths	Healing 1st intention	Infected wounds *	Complications
Scalp wounds	139	—	135 (97·1%)	4	1 extradural abscess
Fractures (dura intact)					
Depressed ..	45	—	41	4	Sequestration, 1
Fissured ..	7	1	5	1	—
Sagittal sinus injury	2	—	2	—	—
Air sinus and eye wounds	9	—	5	4	Sinusitis, 1; rhinorrhœa, 1
Face wounds	1	—	1	—	—
Ear wounds	5	—	4	1	Mastoiditis and subcutaneous abscess, 1
Total ..	69	1	58 (84·1%)	10	
Open brain wounds					
Perforating brain wounds (metal in-driven	51	12	35	7	Cerebral fungus, 4; meningitis, 4; cerebral abscess, 1; fits, 1 cerebrospinal fluid leak, 2
Compound fracture (indriven bone only)	24	5	19	3	Cerebral fungus, 2; meningitis, 1
Compound fracture (dura torn)	10	—	9	1	Fits, 2
Air sinus and eye-brain wounds	7	2	5	1	Pulmonary embolus, 1; rhinorrhœa, 1
Ear-brain wounds	3	2	1	—	Mastoiditis, 1
Face-brain wounds	1	—	1	—	—
Sagittal sinus brain wounds	6	3	3	1	Sagittal sinus thrombosis, 1
Total ..	102	24 (23·6%)	73 (71·6%)	13	
Grand total	310	25	266	27	

* Including wounds left open.

OPERATIVE TREATMENT

There is no doubt that the surgeon who first operates on an open brain wound makes or mars it. There is no useful first-aid operation—ideally, the initial operation should be the final and complete one. Failure to obtain primary union or inadequate removal of indriven bone fragments all too frequently means the vicious circle of cerebral fungus, abscess and meningitis.

The first step is adequate excision of the contaminated scalp through all layers, including any side lacerations or undermined flaps. This is in contrast to the general trend of war surgery elsewhere in the body, where skin excision is becoming more and more sparing. At the same time, it must be remembered that the wound has to be closed, and for this reason every available millimetre of healthy skin must be preserved.

The next step is the removal of all loose fragments of bone and excision of the bone edges until the dural rent is fully exposed. Care should be taken to avoid extensive baring of the surrounding bone. Elevated or depressed flaps with sound periosteal attachments may be left behind.

The dura is treated conservatively and only obviously contaminated tags are excised, while the brain track is cleaned out with gentle suction and irrigation. The object should be to remove all indriven bone fragments, together with the surrounding pulped brain and indriven hair and dirt. Metal is nearly always sterile and need not be removed unless it presents itself. In only a few cases in this series did we fail to secure all the indriven bone chips.

TABLE IV—SECONDARY OPERATIONS (PREVIOUSLY OPERATED ON BY GENERAL SURGEONS)

Type of case	No. of cases	Deaths	Healing 1st intention	Infected wounds	Complications
Scalp wounds	4	—	3	1	—
Compound fractures	2	—	1	1	—
Open brain wounds	9	1	3	4	Encephalitis, 1; mastoiditis, 2; cerebral fungus, 1
Total ..	15	1	7	6	

The final closure is the crucial part of the operation. The rule is complete and accurate suture of the scalp without tension. Two layers of fine interrupted waxed silk, one in the galea and one in the superficial skin, is the ideal, and the skin layer can be removed in three days; but one layer of silk through and through may be satisfactory, providing the stitches are placed exactly at the right tension and are left in place a few days longer.

The difficulty, of course, in scalp closure arises when the wound edges cannot be approximated except under tension. Then the unerring rule must be to extend the incision in an appropriate manner, in order to mobilise and release loose portions of the scalp to fill the gaps. The methods used (fig. 2) vary according to the circumstances: sometimes extension into a simple flap will do it; at other times modifications of the Cushing triradiate or "Isle of Man" incision are simplest; or a flap may have to be swung sideways across the defect. In this series it was never found necessary to leave bare areas elsewhere in the scalp, as is sometimes advocated.

A hoar-frost dusting of sulphathiazole powder to the wound before closure was used as a routine, and a small corrugated rubber stab drain was inserted for 24–48 hours.

Slight modifications were made in this technique for special types of wounds, though the general principles were adhered to. In one or two air-sinus brain wounds, the dura was closed with a free fascial graft, though as a rule, owing to limited exposure, we preferred to delay this repair.

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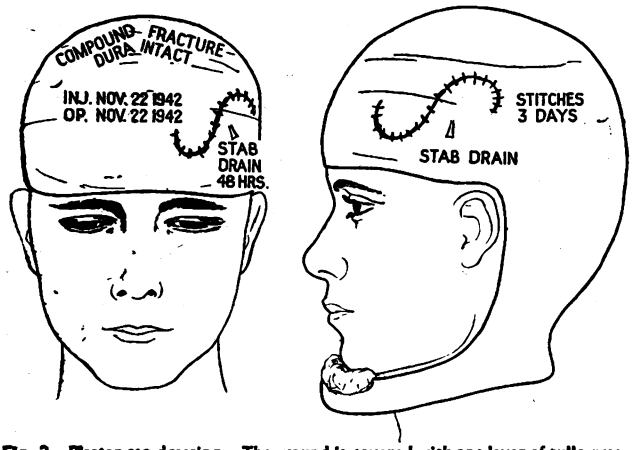

Fig. 3—Plaster cap dressing. The wound is covered with one layer of tulle-gras, gauze and cotton-wool which is carefully padded to cover the whole head. A 6-in. 'Cellona' bandage is then applied backwards and forwards across the vertex to form a plaster cap, which is moulded smoothly behind the ears, down to the eyebrows and low behind the occiput. If the patient is confused and restless a strap is loosely applied around the chin, with a pad of cotton-wool under the chin.

If the eye was damaged, but not in communication with the wound, closure was done in the usual way; but if the missile had passed through the eye into the brain the orbital contents were removed and the lids sutured across. Ear wounds were closed in the ordinary way after as wide an excision as possible. They healed well on the whole, but several cases later required mastoidectomy.

In cases of sagittal sinus injury repair was effected with a series of interrupted silk sutures reinforced with muscle grafts, and no case of fatal hæmorrhage occurred.

On the whole, we found the cases of compound fracture with indriven bone the most difficult to treat, for the wounds were glancing or gutter in type, with large scalp defects requiring in their closure an elaborate plastic repair of the skin.

DRESSINGS AND POSTOPERATIVE TREATMENT

A secure head dressing was all-important in our cases, for they had to travel hundreds of miles by air before the wound could receive further attention. We came to rely exclusively on the plaster cap (fig. 3). Properly applied, this is an ideal compact and secure pressure dressing, and if the patient is restless and confused a loose strap from the occiput under the chin defeats all attempts to tear it off.

TABLE V—CASES REACHING BASE AFTER OPERATION IN FORWARD AREA BY GENERAL SURGEONS*

Type of case	No. of cases	Deaths	Healing 1st intention	Infected wounds	Complications
Scalp wounds	13	—	7	6	Sequestration, 2
Compound fractures (dura intact)	8	—	1	7	—
Brain wounds	24	3	5	19	Cerebral abscess, 5; cerebral fungi, 9; encephalitis, 3; meningitis, 8
Total	45	3	13	32	

* From notes kindly made available by the base unit.

Sulphadiazine (3 grammes 4-hourly for 48 hours and then 3 g. t.d.s. orally, or 5 g. b.d. intravenously for the unconscious patient) was used routinely for wounds involving the brain.

Nursing was carried out for the first day or two in the general tented wards of the CCS on beds or stretchers according to supply. A small stock of rubber air-rings was carried to help with the nursing of the unconscious patients.

The chief problem in the postoperative treatment is to keep the patient quiet; for this we relied on paraldehyde (3 drachms orally, 8 drachms per rectum, or 3 c.cm. intravenously) or soluble phenobarbitone (gr. 3) intravenously. In comatose patients a nasal stomach-tube was inserted and fluids were passed to avoid dehydration.

EVACUATION

All being well, the cases operated on by the forward team were evacuated about the second or third day after operation by air. Contrary to popular belief, they travelled just as well after operation as they do before, and invariably arrived in good condition. Even cases with ruptured venous sinuses repaired with muscle grafts were not disturbed by the journey.

The assessment of disability and disposal of these patients and any reoperative treatment necessary were carried out by the base unit, except for the less severe cases, which were returned to duty from the advanced base.

Results

The wounds in this study were due to shell, bomb or mine explosions or bullets, except for 50 scalp wounds, 9 fractures with intact dura, and 4 open brain wounds which were caused by the accidents (traffic, &c.) associated with modern warfare.

For the purposes of analysis the cases have been classified in the generally accepted manner—namely, those involving scalp only; those involving bone; and those in which the dura was penetrated (table IV). Cases which had previously been operated on by general surgeons in the forward area are separated from the main group in which the primary operation was done by the neurosurgical team. They are divided into two groups: cases subsequently operated on again by the neurosurgical team (table IV), and cases reaching the base without further operation (table V). Most cases in tables IV and V were operated on by the general surgeons

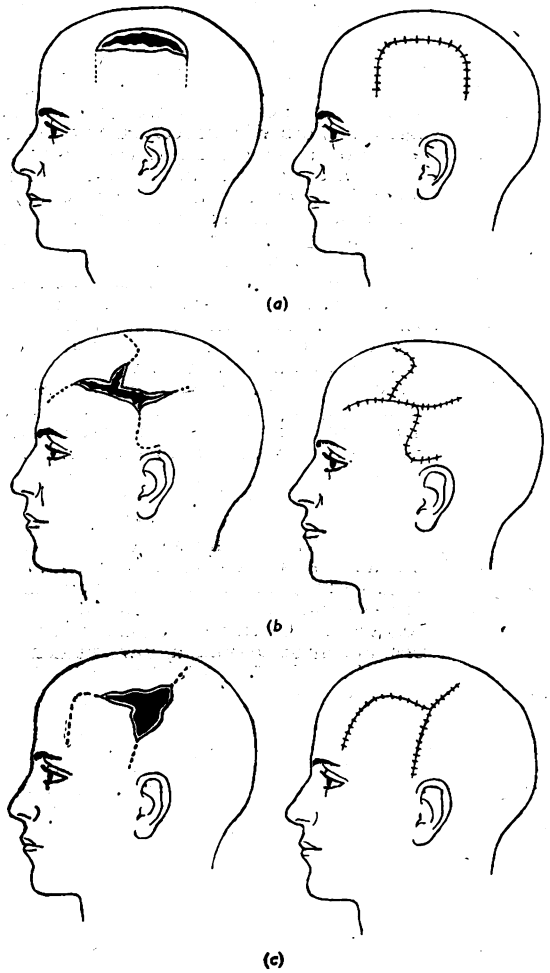

Fig. 2—Methods of wound closure: (a) by flap; (b) double three-cornered closure; (c) by sliding flap. The interrupted lines indicate the extension incisions.

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within 12–24 hours of wounding, while our cases include many operated on by the advanced base team at longer intervals after wounding.

The time intervals in our series are given in table II. The figures in the later periods are too few for any deductions to be drawn. By primary healing is meant a sound dry wound with the stitches removed and observed for at least a week.

Table III shows the classified results. It will be seen that the proportion of wounds healing by first intention in our series was high and that in consequence the incidence of infective complications has been low. In the series of cases treated by the general surgeons (table V) the incidence of healing by first intention was much lower and the incidence of complications higher. This is in spite of the fact, as table II shows, that not all our cases were operated on within the first 72 hours of injury. An all-round figure of 85% primary union of head wounds (71% of brain wounds) means that the majority of cases reach the base requiring only rehabilitation of reparative treatment. The bogy of sepsis is largely dispelled.

The mortality figure has really little meaning, for the mortality in these cases depends to a great extent on how near you are to the front and what you operate on. Other cases must have died ahead of us in the field ambulances or on the battlefield, while 18 cases died before they could be operated on in the CCS. Of the deaths following operation, 18 out of 25 were caused by the initial brain damage, mostly within the first 24 hours of operation, but a few survived some days longer. Of these 18 patients 12 were comatose, and the other 6 in semi-coma; 5 had transventricular wounds; 2 had through-and-through wounds; and the other 10 had deep perforating injuries, 1 being cerebellar.

Of the remaining patients, whose death was not due directly to the initial brain damage, 1 had gas gangrene of the arm and brain and another died of an anaerobic streptococcal infection in a leg wound; while there was a case of pulmonary embolism on the 10th day. The 3 others had perforating ventricular wounds and died of the delayed effects of infection; one had a wound 6 days old and crawling with maggots when received and died of meningitis 12 days later; the other 2 developed meningitis 75 and 42 days after operation, the former immediately after reoperation for a retained bone chip and the latter in spite of the fact that all bone chips had been removed 42 days earlier.

It is still too early to give full figures for disposal of these patients; the majority have been followed for a period of three months, but some of the later ones for shorter periods than this. In general it may be said that all scalp wounds without other injuries returned to duty usually within 10 days to 3 weeks. This was also true of the simpler depressed fractures. Of the more severe cases almost all those without neurological signs, and about half those with abnormal neurological signs, could be expected to return to duty within about 3 months.

Conclusion

The peculiar circumstances of an actively moving campaign with ever-lengthening lines of communication demanded that head injuries be treated in the field. The figures in this series show that specialised neurological surgery can be carried out under these conditions, and that the result of treating head wounds early is a high proportion of primary healing and a low incidence of complications.

This work was made possible by the efficient organisation of the medical services of the Eighth Army and by the loyal coöperation of the unit (Major R. P. Harbord, anæsthetist; Captain S. H. Llewellyn-Smith, neurologist; Captain H. S. Slemon, surgeon; Captain F. J. Gillingham, general duties officer; and staff). I am indebted to Brigadier Cairns, consultant neurosurgeon, for his help and advice in writing this paper.

The conjoint committee of Epsom College will in February award an annuity of £34 to a spinster daughter of a duly qualified medical man. Candidates must not be less than 65 years of age, and their annual income must not exceed £91 5s. Forms of application may be had from the secretary's office, Epsom College, Surrey, and must be returned by Jan. 17.

CONCEPT OF A PSYCHOSOMATIC AFFECTION

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> "By the construction of new concepts we can enlarge the range of our perceptual experiences and so become acquainted with new facts."
> —F. G. CROOKSHANK in *Influenza and other Essays.*

THE purpose of this paper is to indicate some of the interesting results which follow from the adoption and use of the concept of a psychosomatic affection. As a preliminary I shall define this as "a bodily disorder whose nature can be appreciated only when emotional disturbances (i.e., psychological happenings) are investigated in addition to physical disturbances (i.e., somatic happenings)."

Recent research has shown the the affections covered by this tentative definition are numerous, and comprise many of the common diseases of general medicine. A list of some of these is given below. Admittedly a number of the labels embrace a diversity of symptom-complexes differing in ætiology, course, and pathology, but many of the illnesses designated by these terms—the majority in respect of the "definite" items—are psychosomatic affections in the sense of the definition.

Gastro-intestinal system
- Definite: duodenal ulcer; mucous colitis; visceroptosis; "stress dyspepsia"; some cases of constipation.
- Possible: gastric ulcer; gall-bladder disease; hæmorrhoids (non-traumatic).

Cardiovascular system
- Definite: essential hypertension; effort syndrome; neuro-circulatory asthenia.
- Possible: some cases of coronary thrombosis; angina pectoris.

Respiratory system
- Definite: asthma.
- Possible: hay-fever; allergic rhinitis; some cases of recurring sinusitis, recurring bronchitis, and recurring tonsillitis.

Genito-urinary system
- Definite: nocturnal enuresis; vaginismus; some cases of menstrual disturbance and of leucorrhœa.
- Possible: Some cases of pyogenic urinary infection; of uterine fibroids; of enlarged prostate; of urinary bleeding.

Locomotor system
- Definite: many cases of "fibrositis," "neuritis," "sciatica," and "lumbago"; also of postural defects (e.g., scoliosis, lordosis and kyphosis).
- Possible: rheumatoid arthritis and some non-traumatic cases of osteo-arthritis.

Endocrine system
- Definite: exophthalmic goitre, hyperthyroidism.
- Possible: some cases of glycosuria, diabetes, tetany, obesity, and myxœdema.

Nervous system
- Definite: migraine, chorea, some cases of epilepsy.
- Possible: paralysis agitans.

Blood
- Possible: Idiopathic hypochromic anæmia.

Skin
- Definite: some cases of prurigo, eczema, pruritus, psoriasis, urticaria, rosacea complex.

Eyes
- Definite: some cases of chronic conjunctivitis, chronic blepharitis, miners' nystagmus.
- Possible: some cases of childhood squint.

Mental (the neuroses)
- Definite: the innumerable bodily disturbances of anxiety state and hysteria.

THE PSYCHOSOMATIC FORMULA

In this list the disorders mentioned seem to be superficially unrelated and in no way connected; but further consideration reveals that many show peculiarities which distinguish them from illnesses which are not psychosomatic (such as infectious diseases, accidents and food deficiencies) and in virtue of which they possess a common "form." These peculiarities relate both to the behaviour of the illnesses in time and to the nature of certain

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ætiological factors; and they may be summarised conveniently by setting them down in a six-point formula by means of which the concept of a psychosomatic affection becomes developed.

1. *Emotion as precipitating factor.*—Examination of patients in series shows that in a high proportion of cases the bodily process emerged, or recurred, on meeting an emotionally upsetting event.
2. *Personality type.*—A particular type of personality tends to be associated with each particular affection.
3. *Sex ratio.*—A marked disproportion in sex incidence is a finding in many, perhaps most, of these disorders.
4. *Associations with other psychosomatic affections.*—Different psychosomatic affections may appear in the same individuals simultaneously, but the more usual phenomenon, as revealed in their natural history, is that of the alternation or of the sequence of different affections.
5. *Family history.*—A significantly high proportion of cases give a history of the same or of an associated disorder in parents, relatives and siblings.
6. *Phasic manifestation.*—The course of the illness tends to be phasic with periods of crudescence, intermission and recurrence.

EMOTION AS A PRECIPITATING FACTOR

When we investigate patients with psychosomatic affections, we find that the illness is often precipitated by an emotional disturbance which was an understandable response to a clearly recognisable disturbing event or events. Sometimes, however, the nature of the event seems petty in the objective sense and inadequate by itself to account for a profound emotional reaction in any "normal" person; but when consideration is given to the personality of the patient and to his previous life history, such minor events can often—and with good reason—be interpreted as acting as the last straw.

Controlled investigations of a series of unselected patients have been made in a number of affections including asthma, peptic ulcer, hypertension, mucous colitis, exophthalmic goitre and rheumatoid arthritis; these indicate that in a significantly high proportion of cases the particular morbid process emerged, or recurred, when the patient met an emotionally upsetting external event or a period of abnormal stress. It may be inferred therefore that many of these persons would not have responded with their particular kind of morbid behaviour—would not have taken ill when they did—in the absence of such events. In a minority no such dramatic events nor any undue stresses could be elicited from the history. All patients, however, before the onset of their illness, had shown abnormalities of disposition and difficulties with their emotional life usually extending back to childhood.

PERSONALITY TYPE

When we meet an individual we receive certain impressions, and experience certain feelings, which provide us with a sense of the person-as-a-whole—his total characteristics—and to this we give the name of personality. Most medical men, especially perhaps those in general practice, come, as their clinical experience grows, to sense that certain kinds of disease tend to go with certain types of person. The impression of types depends on the general configuration of the patient; on his external expression (which is a matter not only of the facies but also of attitude, posture and manner of movement); on his "internal expressions" (as revealed outwardly in pallor, flushings, throbbings, size of pupils); and also on impacts that are often indescribable but which arouse intuitions belonging to the order of "hunches." Psychological investigation of disposition does, however, allow some of these hunches to be described in a communicable way.

The intuitive idea that different types of syndrome or disease may be expressions of different types of personality applies especially to psychosomatic affections. Studies of personality in relation to disease have made little progress partly because of the complicated statistical procedure involved and partly because of the difficulty of ascertaining which of the innumerable aspects of a person are most relevant. A psychological approach to personality takes account of traits relating to intelligence, dispositions and character. This approach is still being developed but it may be said that so far no adequate method of assessing types has yet been devised. Four broad types have, however, been described.

Hysterical or histrionic type.—This is associated with hysteria in its somatic manifestations whether sensori-motor disturbances (such as paralysis or spasms, anæsthesias or severe pains), or autonomic disturbances (such as vasomotor flushes or rashes).

Hypersensitive or allergic type.—Exemplified in asthma.

Self-assertive, self-sufficient, over-active, "ulcer" type.—Exemplified in peptic ulcer and certain cases of fibrositis and hypertension.

Self-restricting, self-sacrificing, "rheumatoid" type.—Exemplified in rheumatoid arthritis.

Persons who develop psychosomatic affections commonly show notable obsessional trends—a term which refers to certain compulsive performances in daily routine such as always being punctual, always orderly and tidy, always very clean, always "doing one's duty"—in short, being generally fixed in one's ways and set in one's ideas.

SEX RATIO

A disproportion in sex incidence is a finding in many, perhaps most, of these affections. The excess is in males for some affections (e.g. childhood asthma, duodenal ulcer), and in females for others (e.g. chorea of childhood, exophthalmic goitre, gall-bladder disease, rheumatoid arthritis). This suggests, among other things, the importance of the endocrine system as a mechanism in the mediation of these affections. It cannot, however, be related to physiological sex differences only, because with changes in the social environment of a community we find the phenomenon of alterations in the sex incidence and this sometimes brings about a complete reversal of the ratio over a period of years. For example, during last century peptic ulcer preponderated in females, but during recent years came to preponderate definitely in males. Conversely, diabetes which, during last century was a disease of males, has now become a disease which preponderates in females. These facts suggest that the emotions must be taken into account in any adequate understanding of these affections. It is evident, however, that though disproportion in the sex incidence seems to be a finding for most psychosomatic organic affections, it cannot be postulated as a sine qua non of all psychosomatic disorders at all periods of time. Lastly, the sex disproportion in the incidence of psychosomatic affections is in striking contrast to the approximately equal sex incidence found in the infectious diseases.

ASSOCIATED, ALTERNATING AND SEQUENT AFFECTIONS

Different psychosomatic affections may appear in the same person simultaneously, but the more usual phenomenon is that of alternation, or sequence, of different affections. Adequate records of associated, alternating and sequent affections are not yet available and except for the definite grouping of asthma, eczema, prurigo, migraine and enuresis, only occasional remarks on the subject are found in the literature. Ryle (1939) in discussing the "visceral neuroses"—a term under which he includes bronchial spasm, spastic colon and "mucous colic," functional disturbances of the bladder and rectum, globus hystericus, heartburn, and simple paroxysmal tachycardia—notes how these rarely occur together in point of time, but alternate or appear at different periods in the patient's life. He contrasts the *temporal separateness* of these psychosomatic affections with the manifestations in human beings of anaphylactic shock in which the symptom-complexes are *synchronous* so that we may observe "simultaneously or concentrated within a period of hours or days": (*a*) the symptoms of shock with a profound fall in the blood-pressure, tachycardia, the sense of impending death; (*b*) angioneurotic œdema; (*c*) urticaria; (*d*) asthma; (*e*) gastro-intestinal disturbances, usually with diarrhœa; and (*f*) polyarthritis.

Sequent affections.—There are some casual references in published work to the time sequence of psychosomatic disorders. Wilson (1939) states that exophthalmic goitre may precede the onset of peptic ulcer but apparently seldom follows it. I have pointed out (Halliday 1941) that the sequence of peptic ulcer, fibrositis, and bronchitis is not uncommon in the medical history of middle-aged insured persons who have been for long periods on the sick list. It is possible that the changing

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endocrinological setting associated with particular phases of the life cycle may be one of the factors determining such sequences. The adult, like the child, may "grow out" of one affection, but he may grow into another.

Repertories of disease.—To illustrate the phenomena of an individual's range of affections, or repertory of disease, two examples are given below. In both cases, the symptoms were responses to upsetting external events or periods of stress and strain. When one affection played Hamlet the others usually left the stage. Any medical man will find numerous analogous cases in his everyday practice.

CASE 1.—A man aged 40. Athletic build, pleasant and superficially sociable. Active and full of schemes. Often incapacitated. His repertory from the age of 26 has included: hysterical neuritis and paralysis of the left arm; anxiety state, followed by "lumbago," which was replaced by acute religious conversion; recurring sinusitis; recurring duodenal ulcer, sometimes with severe bleeding.

CASE 2.—A woman aged 37. Small, dark, with visceroptosis, tense and active and rigid in routine. Seldom incapacitated but "works on." Her repertory from the age of 24 has included the following, all of which have been recurrent: spastic colon, with spitfire diarrhœa; floating kidney symptoms; left-sided hemicrania; sore feet; facial eruptions of the rosacea complex; hypochromic anæmia with feelings of difficulty in swallowing.

MENTAL DISORDERS AS ASSOCIATED AFFECTIONS

Psychoneuroses.—A study of the natural history of psychosomatic affections shows that psychoneurotic illnesses may accompany psychosomatic organic diseases or may appear as preceding, alternating, or sequent disorders. During the course of psychoanalytical treatment this switching over is sometimes illustrated dramatically when, as a mental symptom becomes alleviated, a somatic manifestation takes its place. Such somatic manifestations are not necessarily one of the usual accepted bodily disturbances of anxiety state or hysteria, but may take the shape of organic expressions such as sore throat, hæmorrhoids, bronchitis, skin eruptions or fibrositis.

Idiopathic psychoses (schizophrenia, manic-depression, paranoia).—It has been suggested that the appearance of an idiopathic psychosis renders a psychosomatic expression unnecessary—a statement which is only partially true, since patients with these disorders often show functional disorders of the alimentary tract, vasomotor and trophic disorders of the skin, as well as abnormalities in posture. There is, however, some rather loose evidence suggesting that among sufferers from the psychoses certain common psychosomatic affections such as peptic ulcer, rheumatoid arthritis and fibrositis are relatively rare.

Psychosis and psychosomatic organic disease may alternate.

I remember a woman who at the age of 28 developed rheumatoid arthritis the activity of which persisted until 3 years later when she became mentally affected and was admitted to a mental hospital. During her 4 years of residence there the arthritis was quiescent but on her recovery to sanity and discharge home it recrudesced until she became completely crippled.

Mental illness and the psychosomatic formula.—A study of relevant data provided by textbooks of psychiatry shows that the separate mental disorders classed under the headings of the psychoneuroses and the idiopathic psychoses comply with the psychosomatic formula in respect of precipitating emotions, personality type, disproportion in sex incidence, positive family history and phasic manifestations—a finding which points to some kind of correspondence, connexion, equivalence, or relationship between psychosomatic affections and mental disorders.

FAMILY HISTORY

Accurate studies of the family history in patients with psychosomatic affections are not numerous. Textbooks usually dismiss the subject by phrases such as "inheritance is important" or "a family history is common." Special investigations have, however, been carried out in a small number of psychosomatic affections set out below, and these indicate that a significantly high proportion of cases give a history of associated disorders in parents, siblings and relatives.

The method of familial transmission is still undecided. Only a proportion of a family become affected. In certain cases no positive family history is obtainable. Genetic (or mendelian) inheritance has not been established in respect of individual psychosomatic affections but there does seem to be inherited a kind of weakness, sensitiveness or inadequacy. There may perhaps also be inherited a predisposition to special patterns of bodily reaction, but this cannot be stated with certainty because of the difficulty of disentangling inherited predisposition from predispositions early acquired through "psychological infection" from the parents giving rise to habits of faulty reaction which become fixed. A psychologist described a similar idea in these words: "Parent-child resemblances in function and dysfunction need not be inherited but may arise through psychological tensions which recur in succeeding generations through unrecognised imitation and identification" (Wilson 1939). But whether biologically inherited or very early acquired the predisposition seems to be woven into the structure of the personality.

Finally it may be noted how common speech assumes that there are family repertories of disease: one family is "highly-strung" another "queer," another has weak stomachs, another is "not strong," another chesty.

PHASIC MANIFESTATION

The course of the illness tends to be phasic with periods of crudescence, intermission and recurrence. Rhythmic manifestations are a feature of all life whether viewed somatically or psychologically, but in the case of psychosomatic affections the rhythm is an irregular one, as may be noted from studying over a period of time patients with peptic ulcer, asthma, rheumatoid arthritis, fibrositis and gall-bladder disease. Each major phase of crudescence varies in severity and has no standard duration. In different people and in the same people on different occasions, the duration may vary from hours or days to months. Each stage is followed naturally by an interval of absence or subsidence, but this is of no constant length. The study of the behaviour of these affections indicates that this negative phase does not necessarily represent—as is sometimes optimistically imagined—"a cure resulting from treatment." Sometimes the primary illness subsides never to return; sometimes it assumes a progressive fulminating quality; and sometimes it merges into chronicity. However, the usual course of these affections is that of irregularly phasic appearances.

Investigations have shown that the irregularity in the appearance of phases of crudescence is associated with the irregularity in time of disturbing or distasteful external events. Conversely the initiation of a negative phase may be related to the removal of disturbing circumstances or the interposition of favourable happenings. "Why does he get better when he does?" is a question answered by the ætiology of natural recovery. Lastly, minor phasic exacerbations or remissions are sometimes associated with cyclic endocrine activity. It is said that menstruation usually worsens the symptoms in asthma and exophthalmic goitre, whereas the endocrine "imbalance" of pregnancy sometimes brings about a subsidence of rheumatoid arthritis or psoriasis.

APPLICATION OF THE PSYCHOSOMATIC FORMULA

The affections mentioned below were chosen solely because data relating to them were readily available. The items under the heading of personality are, however, for reasons previously mentioned, somewhat defective. Adequate basic data for many of the psychosomatic affections mentioned in the list does not seem at present to exist. Where the origin of the reference is not given the source of the authority is one or more of the standard textbooks of medicine. All are recognised as being phasic.

DUODENAL ULCER

1. *Emotion.*—In serial investigation the proportion of upsetting external events at onset is significantly greater than in controls (Wilson 1939).
2. *Personality.*—Persons who develop duodenal ulcer usually show on the surface an over-emphasised activity, efficiency and independence. They are especially susceptible to threats to security (including problems relating to occupation and finance) or by the anxieties

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engendered by being in charge or in authority (Wilson 1939). Many of them show a sustained relentless application associated with obsessional and compulsive drives. All these characteristics are present very early in life (Mittelmann and Wolff 1942).

3. *Sex.*—Three to four times commoner in males than in females (Bell 1940).
4. *Associated affections.*—Migraine, hypertension, "fibrositis."
5. *Family history of psychosomatic illness.*—Four to five times commoner in cases than controls.

HYPERTENSION

1. *Emotion.*—Mental stress, excitement and upsets are important.
2. *Personality.*—Corresponds with that of the "ulcer" personality.
3. *Sex.*—Two to three times commoner in females (Bell 1940).
4. *Associated affections.*—Migraine, hyperthyroidism, peptic ulcer.
5. *Family history.*—About twice as great in cases as in controls (Brown 1936).

RHEUMATOID ARTHRITIS

1. *Emotion.*—In serial investigation the proportion of upsetting external events at onset is greater than in controls (Cobb et al. 1939).
2. *Personality.*—Persons who develop rheumatoid arthritis show definite emotional self-limitation and self-restriction. They tend to be independent and self-sufficient, keeping themselves to themselves. They are self-sacrificing and show obsessional trends: for example they may be over-tidy, over-cleanly, over-conscientious, a slave to routine and with a heavily developed sense of duty (Halliday 1942).
3. *Sex.*—Three to five times commoner in females than in males.
4. *Associated affections.*—Psoriasis, iridocyclitis.
5. *Family history.*—A positive family history in 30–40%.

EXOPHTHALMIC GOITRE

1. *Emotion.*—In 85% of over 3000 cases there was a clear history of a well-defined upsetting external factor (Bram 1927).
2. *Personality.*—Nervous, impatient, irritable, tending to violent emotions (Brown 1936).
3. *Sex.*—Eight times commoner in females than in males.
4. *Associated affections.*—Diabetes, peptic ulcer.
5. *Family history.*—"Unusually high and includes also a family history of diabetes and nervousness" (Donnison 1937).

FIBROSITIS

This is distinguished from the pains and stiffness of hysteria and depressive states.

1. *Emotion.*—"No controlled statistical studies, but frequent" (Halliday 1941).
2. *Personality.*—Not yet adequately described, but shows a correspondence with the ulcer personality; obsessional trends are not uncommon (Halliday 1941).
3. *Sex.*—No reliable statistics available because of confusion with fibrositis and hysterical pains.
4. *Associated affections.*—Peptic ulcer, bronchitis, anxiety states.
5. *Family history.*—Incidence high (Buckley 1938).

ASTHMA

1. *Emotion.*—Important.
2. *Personality.*—An intelligence much above the average; irritable and aggressive, quick to respond; over-anxious, insecure and lacking in confidence; this hypersensitive personality stands tension very badly (Roger-son 1943). Characterised by lack of self-confidence and need for love and protection. To compensate for this underlying tendency, various defence reactions may be employed—e.g., being very good and helping and protecting others, or alternatively, seeking to obtain attention by particularly aggressive behaviour (French and Alexander 1941).
3. *Sex.*—In children two or three males for every female but in early adult life the sex incidence is equal (Bray 1931).
4. *Associated affections.*—Eczema, prurigo, migraine, enuresis.
5. *Family history.*—In 30–60% (Bray 1931).

MUCOUS COLITIS

1. *Emotions.*—Important.
2. *Personality.*—(*a*) Morphologically: among cases of spastic colon there is a preponderance of thin, spare, dark, pale persons (Ryle 1939). (*b*) There is considerable marked muscular tension, the concomitant of autonomic instability. (*c*) The person usually shows obsessional trends; depressions are not uncommon (White et al. 1939). Not unlike the allergic personality.
3. *Sex.*—Four to five times commoner in females.
4. *Associated affections.*—Asthma, urticaria, effort syndrome.
5. *Family history.*—High incidence.

CHOREA

1. *Emotion.*—Emotional stress, especially if of long duration, is important (Hubble 1943).
2. *Personality.*—"Nervous instability characterised by a quantitative increase in emotion and kinesis." The peculiar excitability of the chorea personality is often concealed under an overemphasised shyness. Usually above the average in intelligence (Hubble 1943). Has resemblances to the allergic personality.
3. *Sex.*—Three times as common in girls as in boys (Hubble 1943).
4. *Associated affections.*—Rheumatic fever, night terrors.
5. *Family history.*—Doubtful; significant in rheumatic fever, however (Draper 1936).

AGE OF ONSET

Each biological period of the life cycle, perhaps partly because of its particular endocrine balance and partly because of the kind of stresses encountered at that time, seems to be a danger age for the primary manifestation of particular affections. When psychosomatic disorders are arranged according to the maximum distribution of age of onset at least four main groupings may be distinguished. Further statistical investigations will, however, provide further and more adequate groupings.

I. *Infancy.*—Exemplified by asthma in which the distribution of the age of onset is at its maximum in the first year of life. It falls steadily to the age of 20, rises again slightly to age 30, and thereafter declines (Bray 1931).

II. *Childhood.*—Exemplified by chorea in which the maximum distribution of age of onset lies between 5 and 15 years.

III. *Adult Prime* (Ages 20–40).—In this group the maximum distribution of age of clinical onset lies in the third and fourth decades. This period of onset, as shown by investigation of patients in series, is connected with the stresses and strains of early adult life, and with the frustrations relating to career, finance and love. The group contains many diverse diseases: peptic ulcer, mucous colitis, hæmorrhoids, rheumatoid arthritis, exophthalmic goitre, some phasic skin diseases, fibrositis, miner's nystagmus, psychoneurotic breakdown, manic-depression, and schizophrenia.

IV. *Adult Decline* (ages 40–60).—The time of onset in this group is probably related to difficulties in adaptation to a lessening prospect in bodily strength, physical love, career, and finance. Accurate distributions of onset are not available. The group may include: hypertension (certainly its end-results); cholecystitis (certainly gall-stones); recurring bronchitis (certainly permanent bronchitis and emphysema); and all manner of skin diseases. Among the last I have noted a generalised eczema, which, like Job's dermatitis, occurs after a series of desperate personal calamities. Among the psychoses, paranoia seems to fall into this group.

Speculation has suggested that different persons in virtue of their particular inherited predisposition are, so to speak, "wound up" to go for a certain time, at the expiry of which their fated mode of psychosomatic behaviour must become manifest. This suggestion, however, oversimplifies the complex problem. It may have a degree of validity in respect of some diseases (e.g., pernicious anæmia which does not, however, seem to fall into the psychosomatic category).

CONCLUSION

The concept of a psychosomatic affection in its developed form brings into relationship a large number of seemingly unrelated facts. The outlook gained shows that many "localised diseases," the names of which have hitherto been found scattered throughout textbooks of medicine under the headings of the various anatomical systems, may now be grouped under a unifying ætiological category. The term psychosomatic affection is

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therefore a valid symbol which provides a new instrument for thinking, for investigation, and for the direction of action.

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TRICHLORETHYLENE-AIR ANALGESIA IN CHILDBIRTH

AN INVESTIGATION WITH A SUITABLE INHALER

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TRICHLORETHYLENE has long been recognised as a potent analgesic agent. Hewer [1] has given a historical account of the investigations into the pharmacology of this substance and states: "Trichlorethylene exerts the most potent and rapid analgesia of all the volatile drugs with which I am familiar including nitrous oxide." Elam [2] has reported favourably on trichlorethylene analgesia in midwifery.

In an investigation carried out at Lewisham Hospital with an inhaler which provided a mixture of trichlorethylene and air 190 patients have received this form of analgesia over periods varying from 30 minutes to 7 hours. The stabilised product 'Trilene' was used.

EFFECTS ON THE MOTHER AND CHILD

Analgesia appeared to be satisfactory. No patient discarded the apparatus or said that it did not help. If for any reason a patient was temporarily deprived of the inhaler, she usually expressed a desire for it to be restored. Patients who were directly questioned stated that it had relieved them. Early in the investigation too great a concentration of trichlorethylene was given and in 5 cases transient loss of consciousness was produced at the end of the second stage when continuous inhalation was required. The apparatus was modified and anæsthesia did not occur subsequently in any case. Fourteen patients became incoherent and somewhat detached from their environment; despite this effect, they obeyed requests very well and coöperation was excellent. None developed restlessness and activity that might have hindered the midwife. All the other patients remained completely orientated but many had amnesia for the actual birth of the infant.

In a few—6 cases—distress was not completely alleviated. These patients were regarded as hysterical by the nursing staff. An increase of the vapour concentration to satisfy this group would probably have resulted in anæsthesia, even though trichlorethylene provides a broad margin between effective analgesia and anæsthesia.

With some of the longer administrations it was noted that the patient inhaled quietly and with less vigour than she had done earlier. This was ascribed to a slight but harmless cumulative action. It was appreciated that the value of any form of analgesia requiring the use of an apparatus may lie to some extent in diversion of the patient's interest.

The *uterine contractions* were not affected in frequency or character in most cases. With one patient it was felt necessary to discontinue the administration because of inhibition of the pains. This incidence is not significant, and is in contrast to the findings of Elam [3] who, however, gives no account of the technique employed. The tone of the uterus after labour was excellent, and this was supported by our experience with trichlorethylene for anæsthesia in midwifery.

Subsequent anæsthesia.—The analgesia did not appear to prejudice the patient or the infant when subsequent anæsthesia was given for instrumental delivery (12 cases in this series) or for any other purpose. Trichlorethylene with nitrous oxide and oxygen was usually employed.

Toxæmias.—Chlorinated compounds related to trichlorethylene are notoriously liable to damage liver and kidney. It might well be considered that this substance would be unsuitable in cases complicated by toxæmia, but the toxicity of trichlorethylene is low. It has been used for anæsthesia on jaundiced patients without ill effect; and in experiments with animals, only after long daily administration for many months were slight hepatic and renal changes demonstrated. Starting with mild analgesia for milder cases, the use of the mixture was extended to all grades of pre-eclamptic toxæmia, even those requiring it for long periods. No harm resulted. There has been no opportunity for using this method in cases of eclampsia, but there seems every reason to recommend its use when procedures likely to induce convulsions have to be performed.

No *cardiac arrhythmias* were observed either by myself or the sisters of the department, who were particularly requested to look out for this complication.

Cardiac disease.—There were 12 patients with mitral stenosis in this series. All obtained satisfactory analgesia. Since the inhaler provides a mixture with almost the same oxygen content as air and no respiratory effort is required in its use, it is free from the objections to nitrous-oxide and air analgesia.

Effects on the infant.—Six infants gave concern at birth owing to delay in beginning respiration. In each case causes other than the analgesia appeared to be responsible—prematurity, precipitate birth, breech presentation, prolonged second stage, and the cord rather tight around the neck. Where analgesia was employed over long periods the babies seemed unharmed. No intrapartum deaths occurred.

After-effects.—Mothers were not questioned specifically as to after-effects, but none complained spontaneously of the headaches and dizziness which have been observed by Hewer. The absence of these symptoms is probably due to the natural sleep that follows delivery.

THE INHALER

The inhaler (see figure) consists of a 4 oz. honey jar with metal cap to which is attached an inverted filling tube so arranged that it is impossible to introduce an excessive quantity of trilene. Thirty c.cm. (1 oz.) is the amount required, and is sufficient for 3–4 hours use. Trichlorethylene vapour of analgesic potency is inhaled by drawing atmospheric air through the portion of the jar above the surface of the liquid. A tube, extending to the centre of the jar and having a centrally placed partition throughout its entire length, passes through the centre of the cap above which it intersects a cross-tube at right angles. The partition in the vertical tube is extended into the horizontal one but does not completely occlude it, a hole of predetermined size being situated at the centre of the extended portion. The branch of the horizontal tube adjacent to the filler accommodates an inspiratory valve and the opposite arm tapers to fit directly into a standard face-mask.

When the patient inhales, most of the air which is drawn in through the inspiratory valve passes along the horizontal tube through the hole in the baffle; a small proportion takes the alternative route through the honey jar, where trichlorethylene vapour is entrained. An expiratory valve, placed above the vertical tube, is

1. Hewer, C. Langton *Proc. R. Soc. Med.* 1942, 35, 463.
2. Elam, J. *Lancet*, 1942, ii, 309.
3. Elam, J. *J. Obstet. Gynæc.* 1943, 50, 120.

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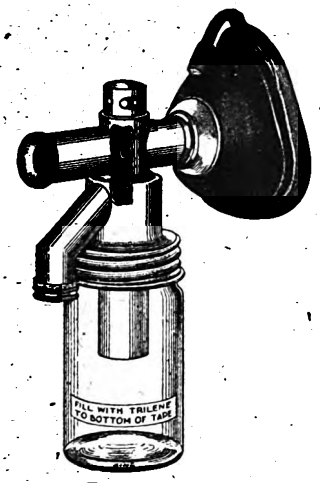
provided for the patient's exhalations. The apparatus has been proportioned to ensure that a mixture of only analgesic potency is inhaled. The mean concentration is 8·2 mg. of trilene per litre of issuing mixture at continuous flow. This represents 0·65% of trilene (weight in weight) in the trilene-air mixture.

An additional precaution against anæsthesia is the provision of an air orifice on the tube to which the face-mask is attached. The orifice is covered by the index finger of the hand that holds the instrument, incomplete occlusion resulting in free admission of air directly to the patient.

It is impossible for the liquid either to be spilt or to enter the respiratory passages whatever the position of the inhaler.

It was thought that the inhaler and the mask should be attached directly together rather than have a length of rubber tubing between them because of the saving in rubber and the greater portability.



The Trilene Inhaler.

TECHNIQUE

The patient comfortably holds the inhaler with the right hand. A short length of tape from the inhaler tied to the wrist prevents it from falling to the floor should she loosen her grip. The proper functioning of the inspiratory and expiratory valves signifies that an accurate fit of the face-mask has been obtained and the sound made by their movement enables the midwife to hear the patient's respirations while attending to other matters.

Administration is essentially the same as for gas-and-air: inhalation throughout each pain if employed in the first stage; inhalation and breath-holding for the pains of the second stage; and continuous inhalation during actual delivery. A watch should be kept on the patient to ensure that inhalation is not continued after a pain has ceased. Requests to the patient during a pain may have to be made in a loud voice.

A fresh amount of trichlorethylene should be used for each case. About 5–10 c.cm. of the liquid is usually vaporised per hour. The remainder is somewhat diluted by water condensed from the patient's breath since there is slight partial rebreathing.

CONCLUSION

This preliminary report encourages a wider investigation.

Adequate analgesia safe for mother and infant was provided by this inhaler. The advantages are as follows: there seem to be no contra-indications to its use; the inhaler is simple and portable, and the vapour concentration cannot be increased; the method is inexpensive and, like the gas-and-air method, could be used by suitably trained midwives. The portability of the inhaler makes it convenient for domiciliary use.

SUMMARY

An investigation into the use of a trichlorethylene-air mixture as an analgesic in midwifery has been made. Satisfactory results were obtained with the mothers, and the infants were unaffected. Toxæmic cases and subjects with rheumatic heart disease were included.

An inhaler has been constructed and its advantages explained.

My thanks are due to Dr. W. Allen Daley, medical officer of health, and to Dr. Humphrey Nockolds, medical superintendent of Lewisham Hospital, for permission to make this investigation. I am particularly indebted to Dr. Amy Fleming for her advice. The inhaler is made by A. Charles King Ltd., and I wish to express my thanks to Mr. King for his interest and help. Dr. R. P. Liston of Imperial Chemical (Pharmaceuticals) Ltd. kindly provided the analysis of the trilene-air mixture.

BLEEDING GUMS AND GINGIVITIS IN NAVAL RATINGS

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MUCH attention has been drawn to the prevalence of bleeding gums and gingivitis among Service personnel in time of war. In 1919 Semple, Price-Jones and Digby found that 12% of Army hospital admissions had bleeding gums, and, in a review of 3000 men, found that 29·5% in one unit had gingivitis. In this war Roff and Glazebrook (1940) showed that 17·6% of Naval trainees had gingivitis, and Ungley and Horton (1943) have investigated cases of sore and bleeding gums in Naval ratings admitted to hospital. It was thought, however, that it might be of interest to keep a watch on the oral state of men under conditions of active service at sea. The following report is based on a survey of the incidence of bleeding gums and gingivitis in such men and on observations on the treatment of those conditions in a destroyer.

METHOD AND FINDINGS

To ascertain the incidence of gum lesions among Naval ratings otherwise physically fit, the men of four ships were examined for sore, bleeding or ulcerated gums. Groups A, B and C were ratings from small sea-going ships, while group D were the personnel of a depot ship. Group A were under my personal observation for a continuous period of 14 months, while groups B, C and D were examined once only. All four groups were on full Service diet, and as they were able to replenish their stores abroad, had considerably more fruit and vegetables than are available at home, either in civilian or Service diets. At their bases abroad canned fruit juice was issued daily and in groups B and C the men were encouraged to take multi-vitamin tablets.

Table I classifies all the cases into mild or severe gingivitis and lists the edentulous ratings. Mild cases

TABLE I—GUM FINDINGS IN RATINGS OF THREE SEA-GOING SHIPS (A–C) AND A DEPOT SHIP (D)

Group	Men examined	Total gingivitis	Mild	Severe	Edentulous
A	156	41 (26·3%)	24 (15·4%)	17 (10·9%)	6 (3·8%)
B	57	21 (36·8%)	15 (26·3%)	6 (10·5%)	1 (1·7%)
C	52	14 (26·9%)	11 (21·1%)	3 (5·8%)	1 (1·9%)
D	349	99 (28·3%)	84 (24·1%)	15 (4·3%)	32 (9·2%)
Totals	614	175 (28·5%)	134 (21·8%)	41 (6·7%)	40 (6·5%)

are those in which clinical examination reveals red and swollen gums which bleed readily on pressure or brushing. Severe cases are those in which the condition is of longer duration and is associated with fœtor, marginal ulceration, alveolar retraction and periodontal pocket formation, but adenitis is seldom found. The lesion is subacute and should not be confused with the acute ulcerative gingivitis associated with Vincent's infection. The edentulous ratings are never affected by gingivitis.

Table II shows the numbers and percentages of cases above and below 30 years of age.

TABLE II—AGE-DISTRIBUTION OF CASES OF GINGIVITIS

Group	Under 30 years		Over 30 years	
	Men	Gingivitis	Men	Gingivitis
A ..	130	35 (27%)	26	6 (23%)
B ..	50	15 (30%)	7	5 (71%)
C ..	44	10 (23%)	9	4 (44%)
D ..	187	13 (6·9%)	141	54 (38%)
Totals ..	411	73 (17·7%)	183	69 (37·7%)

The remainder of the work described was done on the officers and men in group A who were under my observation for 14 months. Of this group, 17 men reported

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their condition spontaneously, 11 being typical cases of gingivitis as already described. Four were cases of acute ulcerative Vincent's infection of gums. Two cases were associated with Vincent's angina of the throat, having well-marked faucial ulceration with membrane formation and cervical adenitis. Smears showed fusiform bacilli and spirochætes, and all those 6 cases gave a previous history of sore and bleeding gums. Investigation of the whole of the ship's company was then carried out, revealing a further 24 cases of gingivitis. In this group, 6 cases of gingivitis (including 2 of acute infection) were under treatment for syphilis by intravenous organic arsenicals.

TREATMENT

Treatment was carried out by scaling on the lines described by Cautley (1943), but no vitamin preparations were given. Intravenous arsenicals seemed to be effective in the faucial infections, leading to cure in 8 days, and seemed to improve acute ulcerative gingivitis, but had no noticeable effect on the more chronic types of gum disease. After investigating the efficacy of mapharside, chromic acid, liquor arsenicalis, gentian violet and euflavine, it was decided that 10% chromic acid followed by hydrogen peroxide produced the speediest results and was the most convenient agent for local application to the gums.

Treatment consisted, therefore, of thorough scaling of the teeth, and, for 2 or 3 days thereafter, the application of 10% chromic acid followed in about a minute by hydrogen peroxide (10 vol.). These were applied on cotton-wool pledgets by means of forceps or a wooden applicator. Very acute or tender gums required to be treated for a few days with chromic acid and mouth-washes before scaling could be attempted. Almost all the cases treated had heavy deposits of tartar, thickest under the gum margin around the bases of the lower incisors and in the molar regions. The removal of this deposit was considered of the greatest importance for a rapid and complete cure of the gingivitis. The instruments used were a dental mirror and probe, and a set of four scalers. This treatment was carried out on board and was found practicable even in rough weather. All cases requiring fillings, extractions or cautery of residual "pockets" were referred to the dentist on reaching harbour, and his opinion was obtained in judging cures.

The criteria for cure were the healing of ulceration, cessation of bleeding from the gum and the reappearance of a healthy pale pink gum margin showing the "health line of Turner." This consists of a pale ischæmic line at the level of the mucoperiosteal junction and running parallel to the gum margin.

In the mild form of lesion cure was effected in 5 days with an extreme of 7 days, while the severe cases became normal in 7 days with an extreme of 12 days. The cases of acute ulcerative gingivitis and Vincent's angina were cured in 6–9 days. Recurrences, at the end of 2 months' observation, were 9 (22%) in number out of the 41 cases affected.

DISCUSSION

A ship provides good conditions for a "closed community" investigation of a clinical type, for while there are no opportunities for laboratory procedures the follow-up of cases is easy. It is realised, however, that personal vagaries in the diagnosis of gingivitis tend to lessen the accuracy and value of comparative statistical surveys in this condition. In this survey 28% of the men examined had bleeding gums or gingivitis. This figure, when compared with the results obtained in the last war among the Armed Forces (Semple, Price-Jones and Digby 1919), must be considered disturbingly high. A control survey should be attempted among civilians, for the condition is not confined to the Services, though Campbell and Cook (1942), in a year's work in a dental hospital, found only 65 cases of gingivitis among 2924 new admissions—i.e., 2·2%.

In any consideration of disease of the gums attention must be drawn to the age of the patients. Up to roughly 30 years of age tooth loss is accounted for mainly by dental caries, but thereafter the foremost reason for extraction is gingival disease (the pyorrhœa of the lay press). It is to be expected, therefore, that a higher percentage of gingivitis will be found after the age of 30. Table II confirms this point but shows that there is still a high percentage among younger men.

Bacteriological smears of the gums in this series produced mixed flora, Vincent's bacilli and spirochætes being almost invariably present. Since very similar smears were obtained from apparently normal mouths, it was not considered profitable to pursue this aspect of the subject, especially in view of the limited facilities available. It was noticed that several men under arsenical treatment for syphilis had ulcerative gingivitis with abundant spirochætes in the smears. This agrees with the findings of Goodridge (1942) and Ungley and Horton (1943). Bismuth overdosage was thought to be a contributory factor in my cases.

The surveys in groups B, C and D were carried out in spring, but all the cases of acute Vincent's infection of mouth and throat occurred during the winter, suggesting the importance of lowered resistance as a precipitating factor. Much controversy has revolved around the rôle of vitamins in infections of the gums. Roff and Glazebrook (1940), Campbell and Cook (1941, 1942), Blockley and Baenziger (1942), Stuhl (1943) and Kent (1943) consider ascorbic acid necessary to produce effective cures. King (1943) advocated the use of nicotinic acid, but did not find ascorbic acid of value. These workers also describe various types of general malaise and ill health in their patients. None of the Naval ratings in this series showed any clinical evidence of vitamin deficiency or general symptoms of ill health. In fact, many had noted no abnormality even of their gums until interrogated. Since accurate estimates of vitamin intake and excretion were impracticable, it was decided to adhere throughout to the ship's normal dietary regime without the addition of synthetic vitamins and to treat all the cases of gingivitis by local measures only. It is evident in this series that, despite a generous diet, a high incidence of bleeding gums and gingivitis has been found, and furthermore, that satisfactory results have been obtained by thorough local treatment without specific vitamin therapy. This appears to agree with the work of McNee and Reid (1942) and of Ungley and Horton (1943), who could find no relationship either in causation or therapeutics between lesions of the gums and deficiency of vitamin C or nicotinic acid.

After 2 months' observation, recurrences comprised 22% of the series and were commoner among the more severe ulcerating lesions of the older men. Recurrence in the mild cases appeared to be due to inefficient scaling in the initial treatment, to chronic tonsillar infection, to the presence of unerupted or impacted molars, or to badly fitting partial dentures. In the older men the relapse usually started from a residual interdental "pocket" in which food and debris had become lodged. Recurrences are to be expected in this condition, and all cases of gingivitis discharged from hospital should be kept under observation by their medical officer.

It is thought that the congestion of Service life is conducive to the spread of gingivitis, but it was not possible to prove any contagion in this series. The cases were evenly spread through the different messes and departments of the ship, and officers and ratings were equally affected. It was perhaps significant that 5 out of the 6 stewards and cooks on board had severe gingivitis. Control of spread was attempted by the isolation of the dishes and cutlery of severe cases and by discouraging such evils as supplying hot drinks to look-outs on watch in a single cracked and unwashed cup.

It is suggested that the most profitable form of treatment and prophylaxis in gingivitis is the provision of facilities for the routine scaling of teeth. Man-power is saved if this can be done by the ship's medical officer, for treatment ashore involves upsetting the work of the ship while in harbour, and may necessitate replacement of the affected personnel. Further, early and adequate treatment discourages the onset of the more serious gingival lesions and eventual tooth loss.

SUMMARY

Examination of the Naval ratings from four ships on active service revealed that 28% had bleeding gums or gingivitis. Diet seemed adequate in vitamins, and local treatment alone produced good results in from 5 to 9 days. Removal of tartar by scaling was considered to

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be of the greatest importance in treatment and prophylaxis.

I wish to thank the Medical Director-General of the Navy for permission to publish this article, also Surgeon Rear-Admiral J. W. McNee, Dr. S. Lazarus and Surgeon Lieutenant (D) C. Ellison, RNVR, for help and advice.

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BACTERIOLOGICAL INVESTIGATIONS IN A MASS CHEST SURVEY

JOSEPH W. BIGGER, M D, SC D DUBL, F R C P, F R C P I
LIEUT.-COLONEL RAMC

EARLY in 1942 Major P. Kerley carried out a preliminary miniature radiography survey of Army personnel. Where a miniature film showed any abnormality, full-size films were made. Radiologically suspicious cases were admitted to hospital where they were investigated clinically by Major-General A. W. Stott, Major W. Phillips and Major A. Bean.

Of the 5737 examined radiologically 20 were referred to me for bacteriological investigation, which was more thorough than would usually be practicable in similar surveys carried out on larger numbers. This paper is concerned only with this aspect of the survey.

The plan of investigation was to examine, from each patient, 10 specimens of sputum microscopically (direct and after concentration), 3 specimens of sputum by culture, and 3 specimens of fasting gastric juice by culture. For a variety of reasons it was not possible to carry out this complete programme on all cases.

The methods of microscopic examination did not differ materially from those generally used, but prolonged staining (10–15 minutes) in hot carbol-fuchsin, thorough decolorisation with both acid and alcohol, and brief counterstaining with 1% malachite-green were regarded as important.

For culture, Griffith's method was followed. Sputum or gastric juice was treated with an equal volume of 5% KOH at 37° C. for 45 min. and inoculated, without neutralisation, dilution or centrifuging, on slopes of culture media in screw-top bottles. It was the intention to inoculate four slopes (one of Loewenstein-Jensen's, two of Griffith's plain egg, and one of Griffith's glycerol-egg media) from each specimen; but for the earlier specimens only Loewenstein-Jensen's medium was available, and it in sufficient quantity to permit the use of only one slope for each specimen. Cultures were incubated at 37° C. They were examined after four or five days to detect contaminations. Films were examined when growth was observed on the surface of the medium (often in 14 to 21 days) and, in all cases, in 5 to 6 weeks even if no growth was then visible.

FINDINGS

Tubercle bacilli were demonstrated microscopically or culturally or by both methods in material from 13 of the 20 patients investigated.

To facilitate consideration of the results, the patients have been classified into five groups on the opinion of the radiologist and physicians, assisted by such laboratory methods as blood sedimentation-rates but completely ignoring the results obtained by bacteriological investigation.

Group I consisted of 4 patients in whom the radiological and clinical evidence was against a diagnosis of pulmonary tuberculosis. Of these, 3 were cases of pneumonitis (atypical pneumonia) and should not have been included in the investigation. A single specimen of sputum from one of these (no. 1) was examined microscopically and no cultures were made. The other two (nos. 2 and 3) were fully investigated with completely negative results. Patient no. 4, a man aged 47, was, on radiological evidence, believed to be suffering from carcinoma or abscess of the lung.

Six specimens of his sputum were examined microscopically in February without tubercle bacilli being found. One specimen of sputum was cultured at that time. When it became known that this culture contained tubercle bacilli, the patient had been temporarily transferred to another hospital for bronchoscopy. He was readmitted in April and, in that month and May, seven further specimens of sputum were examined microscopically. The first five of these were negative, the last two positive. Cultures were made during this period from four specimens of sputum and three of gastric juice. Two of the sputum cultures were positive, but none of the cultures of gastric juice. Exactly three months elapsed between the day when the first positive sputum culture was inoculated and that on which a specimen of sputum was found to be positive microscopically. It is of interest that the finding of tubercle bacilli by direct microscopic examination coincided with the radiological demonstration of cavitation.

Group II consisted of 5 patients in whom the diagnosis of healed pulmonary tuberculosis with no evidence of activity had been made. In 3 of these (nos. 5, 6 and 7) all bacteriological results were negative. The other 2 (nos. 8 and 9) each yielded one positive culture (one from sputum and the other from fasting juice): all specimens examined microscopically were negative.

Group III consisted of one patient (no. 10) in whom the radiological diagnosis was recent pulmonary tuberculosis. Clinical signs were absent but the history of increasing fatigue was suspicious. Complete bacteriological examination yielded negative results.

TABLE I—RESULTS OF EXAMINATIONS

Group	Diagnosis	Patient no.	Tubercle bacilli: Sputum: microscopic	Tubercle bacilli: Sputum: culture	Tubercle bacilli: Gastric juice (culture)
I	Pulmonary infiltration, considered to be non-tuberculous.	1	−	0	0
		2	−	−	−
		3	−	−	−
		4	+	+	−
II	Healed pulmonary tuberculosis: no evidence of activity.	5	−	−	−
		6	−	−	−
		7	−	−	−
		8	−	+	−
		9	−	−	+
III	Radiological evidence of bilateral fibrosis and cavitation: no physical signs.	10	−	−	−
IV	Active pulmonary tuberculosis suspected.	11	−	+	+
V	Active pulmonary tuberculosis diagnosed.	12	+	0	0
		13	+	0	0
		14	+	0	0
		15	+	0	0
		16	+	0	0
		17	+	+	−
		18	+	+	+
		19	+	+	−
		20	−	−	+

+ = Tubercle bacilli found. − = Tubercle bacilli not found. 0 = Not examined.

Group IV consisted of one patient (no. 11) with a diagnosis of pulmonary tuberculosis believed to be active. Eleven specimens of sputum were examined microscopically: all were negative. Four specimens of sputum yielded one positive culture. Three specimens of gastric juice were all positive culturally.

Group V consisted of 9 patients in whom a diagnosis of active pulmonary tuberculosis was made. In 5 cases (nos. 12, 13, 14, 15 and 16) the diagnosis was confirmed by finding tubercle bacilli microscopically in their sputa: cultures were not made in these cases. In 3 (nos. 17, 18 and 19) tubercle bacilli were found microscopically in sputum and culturally either in sputum or in both sputum and gastric juice. The last patient in this group (no. 20) is of interest. Twelve specimens of sputum were examined microscopically with negative results. Two specimens of sputum and two of fasting juice were cultured. Of these one specimen of fasting juice was positive. A specimen of pleural fluid from this case yielded tubercle bacilli on culture.

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DISCUSSION

Bacteriological methods (if we accept as valid the single positive results in nos. 8 and 9) established a diagnosis of active pulmonary tuberculosis in 13 cases. In all the 10 cases in which active pulmonary tuberculosis was suspected or actually diagnosed on radiological and clinical grounds, the diagnosis was confirmed bacteriologically. In addition, tubercle bacilli were demonstrated in 2 cases with radiological evidence of healed lesions and with no clinical signs of activity and in one case where no radiological or clinical evidence of pulmonary tuberculosis was found until some time after the bacteriological diagnosis had been made.

Positive cultures were obtained from material from 8 cases. Cultures from 5 of these were injected into guineapigs, all of which developed typical tuberculous lesions in which tubercle bacilli were identified. There is no reason to doubt that all the cultures isolated were of tubercle bacilli.

Loewenstein-Jensen's medium appeared to be slightly superior to both Griffith's plain egg and Griffith's glycerol-egg media. No attempt to type the strains of tubercle bacilli isolated was made, but from the superior growth on Loewenstein-Jensen's medium (which contains glycerol) these were all believed to be of human type.

This investigation afforded an opportunity of comparing various methods of demonstrating the presence of tubercle bacilli in human pathological material. It established very clearly the fallacy of relying on one or even several microscopically negative examinations of sputum to exclude a diagnosis of active tuberculosis. In case 18 the fifth specimen examined was the first in which tubercle bacilli were found: in case 17 the sixth and in case 4 the twelfth specimens were the first found positive. Concentration was not found superior to direct examination of carefully selected portions of sputum, correctly stained. No specimen was found positive after concentration where direct examination had been negative.

The investigation also established culture of both sputum and fasting gastric juice as a practicable, valuable and early diagnostic method. In 4 cases cultures were positive although all microscopic examinations were negative. In 2 cases cultures of gastric juice were positive where both microscopic and cultural examination of sputum were negative. In one case tubercle bacilli were demonstrated in sputum by culture three months before their presence was detected microscopically.

The superiority of culture over microscopic examination is shown by comparing all the results in the 13 cases found positive by any bacteriological method (table II).

TABLE II—RESULTS OF CULTURE AND MICROSCOPIC EXAMINATION

—	Tubercle bacilli		
	+	−	Per cent +
Sputum (microscopic) ..	14	80	15
Sputum (culture)	9	15	37
Gastric juice (culture) ..	6	9	40

The percentages are given not because, with such small numbers, they have any validity but merely to facilitate comparison.

From the experience gained during this investigation the following scheme of bacteriological investigation is suggested as a practicable one which should be followed where there is radiological or clinical evidence of active pulmonary tuberculosis.

SCHEME OF INVESTIGATION

Three specimens of sputum should first be examined microscopically. Where these are negative, three specimens of sputum and three of fasting gastric juice should be cultured. Griffith's method is recommended and two tubes of Loewenstein-Jensen's medium and one of either the same medium without glycerol or of Griffith's plain egg medium should be used for each specimen. Medium without glycerol is included in order to facilitate the culture of tubercle bacilli of bovine type.

SUMMARY

1. Twenty cases from a miniature radiography survey were investigated bacteriologically.

2. In all the ten cases where active pulmonary tuberculosis was diagnosed or suspected, excretion of tubercle bacilli was demonstrated.

3. Tubercle bacilli were also found in material from 3 other cases in which a diagnosis of active pulmonary tuberculosis was not made on radiological or clinical grounds.

4. Culture of both sputum and fasting gastric juice was shown to be a practicable, valuable and early diagnostic method.

CONDUCTION-TIME FOR HUMAN PAIN SENSATION

G. GORDON, B M OXFD D. WHITTERIDGE, B M OXFD

(*From the Departments of Physiology and Surgery, Oxford*)

IT has been known for some years that the alpha rhythm of the human electro-encephalogram, in subjects with their eyes shut, can be disturbed by unexpected stimulation of the skin (Adrian and Matthews 1934). We have been interested to find out whether the time-interval between such a stimulus and the disturbance of the alpha rhythm is sufficiently constant to justify its use as an approximate measure of sensory conduction-time. Such a method would have the advantage of being objective, whereas the existing methods of assessing sensory conduction depend on the reaction-time, which involves an inevitable subjective element.

The method has several practical disadvantages. In the first place, it is essential that the subject should show a steady alpha rhythm, which is not liable to many spontaneous fluctuations, but which is easily disturbed by painful stimulation. It is our experience that a subject will have a steadier alpha rhythm if he has been used for the experiment several times, and is no longer apprehensive; but even then, many people will be found unsuitable. For this reason, we feel that the method is only useful for experimental purposes.

Secondly, there is evidence that the effect of a stimulus will depend to some extent on the place in the alpha cycle in which it falls (Bartley 1941), so that measured differences of less than 0·1 sec. are unlikely to be significant, the normal frequency of the alpha rhythm being about 10 per sec. This limits the method to the investigation of conduction rates of about 0·5–5 metres per sec.

A sharpened steel wire was used as a stimulator, and the exact time of stimulation was recorded electrically.

RESULTS

In suitable subjects a needle-prick in the hand or foot is followed by a definite disturbance of the alpha rhythm (fig. 1). This effect is often more pronounced in the parietal than in the occipital region. In normal subjects light touch on the hand or foot does not usually lead to disturbance of the rhythm, though it may sometimes do so the first time it is applied. The response to needle-prick, however, is maintained until a large number of stimuli have been given.

The average time-intervals between the stimulus and the disturbance are given in the table. The values from the normal finger and toe do not differ significantly.

INTERVALS BETWEEN TIME OF STIMULATION AND DISTURBANCE OF ALPHA RHYTHM IN NORMAL SUBJECTS

Part stimulated	No. of observations	Av. time-interval (sec.)	Standard deviation
Finger { normal ..	14	0·26	± 0·04
Finger { asphyxiated ..	10	1·04	± 0·11
Toe { normal	18	0·23	± 0·04
Toe { asphyxiated ..	12	1·40	± 0·20

It is recognised that cutaneous pain can be separated into two components, an immediate flash of pain, followed after an interval by a more diffuse "second pain." The first pain can be abolished by long asphyxia of the part, so that after an hour or more the second pain alone can be felt (Lewis and Pochin 1938). As

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other sensations are successively abolished during asphyxia, the second pain becomes definitely more unpleasant. It is probable that second pain is mediated by unmyelinated fibres, which conduct at about 1 m. per sec., and can resist asphyxia for longer periods than the larger fibres (Clark et al. 1935). The fibres mediating "first pain" probably conduct at 12–30 m. per sec. (Zotterman 1939).

We have studied the effect of second pain on the alpha rhythm, and have found that after the base of the finger or toe has been compressed with a cuff for an hour or more to occlude its blood-supply a disturbance of the alpha rhythm is only seen when a second or so has elapsed since the stimulus (fig. 2). The time-intervals are given in the table: the interval for the toe is significantly greater than that for the finger, corresponding to the greater distance travelled by the impulse before reaching the spinal cord. The duration of the disturbance which follows second pain is often greater than that following first pain.

The results obtained with first and second pain in normal subjects indicate both the degree of accuracy and the limitations of this method, and they were sufficiently encouraging to justify us in using the method with several cases of peripheral nerve injury which showed sensory abnormalities.

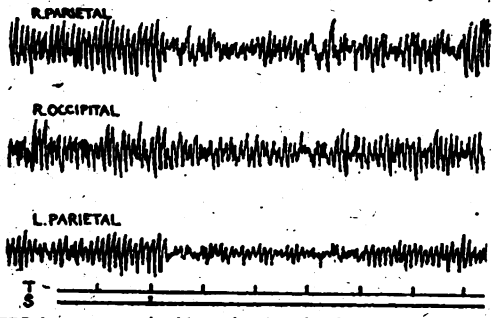

Fig. 1—EEG from a normal subject, showing the disturbance of alpha rhythm following a pin-prick on the left forefinger. The point of stimulation is shown by the signal (S). Time (T) is given in 1 sec. intervals. The disturbance occurs 0·3 sec. after the pin-prick.

Two of these patients showed a cutaneous *hyperpathia* affecting the foot (Head's protopathic sensibility). Both men had sustained gunshot wounds injuring nerves in continuity: in one, the posterior tibial nerve was injured at the ankle, and in the other the sciatic nerve had been injured six months previously near the sciatic notch. In the first man, with a lesion near the ankle, there was no appreciable abnormal delay between the stimulus and the disturbance of the alpha rhythm, the average time-interval being 0·24 sec.; but in the case of injury near the sciatic notch, the average interval was 0·45 sec., a figure significantly higher than that for a normal foot.

In the third case, hyperpathia was the result of an irritative lesion of the median nerve, a sequel to sepsis in the thumb. It was unaffected by removal of the appropriate digital nerve. In this case we could detect no abnormal delay in the response to pin-prick, the average time-interval being 0·21 sec.

DISCUSSION

This method is sufficiently accurate to enable us to distinguish easily between the conduction-times for human first and second pain, the latter being mediated by fibres conducting at about 1 m. per sec. We have also been able to distinguish between the conduction-times for second pain in the hand and in the foot. These results confirm the observations of Lewis and Pochin (1938), who used a reaction-time method.

Our results with 2 cases of peripheral nerve injury showing "protopathic sensibility" in the foot have demonstrated that neither patient showed a delay in pain conduction of the order of that seen in second pain. In both these cases, and in the case of irritative lesion of the median nerve, rapidly conducting fibres must be present. The delay in conduction observed in one case with a lesion near the sciatic notch is likely to depend on the length of nerve distal to the lesion, which was still incompletely myelinated, and had not yet attained its full rate of conduction.

In tabes dorsalis (Pochin 1938), and in alcoholic neuritis (Stein et al. 1941), cutaneous dysæsthesia is often accompanied by delay in pain perception very similar to that of second pain, and these phenomena have been attributed to the destruction of the fast-conducting fibres. In the cases we have described however, where this delay is not present, we suggest that another explanation must be sought.

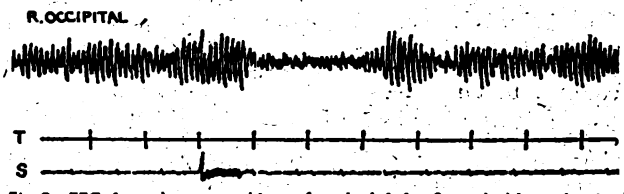

Fig. 2—EEG from the same subject, after the left forefinger had been deprived of its blood-supply for 90 min. The disturbance occurs 0·9 sec. after the pin-prick.

SUMMARY

A method is described by which the conduction-time for painful cutaneous stimulation can be approximately measured. Disruption of the alpha rhythm of the EEG is used as an indicator of a cortical disturbance. It is suggested that this method has experimental applications, since it has an advantage in being objective.

The results described and discussed above were obtained in normal persons, before and after asphyxia of the stimulated part, and in 3 cases of peripheral nerve lesion showing sensory abnormalities.

We would like to express our thanks to Prof. H. J. Seddon for his help and for allowing us to investigate cases of peripheral nerve injury under his care; to Mr. R. B. Zachary, who has helped us greatly in the selection of cases; and to Miss D. J. Dow for assistance with the experiments.

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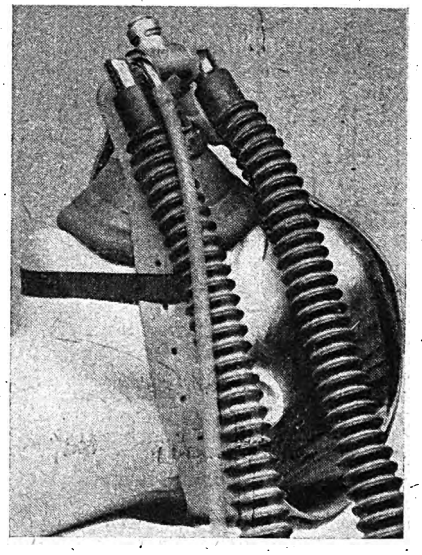
New Inventions

FLEXIBLE FACEPIECE CONNEXION FOR CLOSED CIRCUIT ANÆSTHESIA

IT is common knowledge that a gas-tight system is essential for closed anæsthesia. The flexible connexion illustrated has been designed to overcome the drag caused by the corrugated tubes and facepiece connexion on circuit apparatus—a common cause of leakage—and it has proved remarkably effective in practice.



The facepiece is held in position by means of a Clausen harness with the addition of a chin strap. The chin strap shown provides a useful support for the jaw besides preventing the facepiece from being dragged upwards and away from the patient's mouth.

The apparatus has been made for me by Medical and Industrial Equipment Ltd. of 12, New Cavendish St, W.1.

I. W. MAGILL, MB BELF, DA.

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Medical Societies

TUBERCULOSIS ASSOCIATION

ON Nov. 19 the association met at 26, Portland Place, W.1, to discuss

BCG Prophylactic Inoculation

when an account of his experience in Norway was read for Dr. O. GALTUNG-HANSEN by Dr. Dedecken. The early records of the period 1910–15 had shown that practically the whole population of the country had been infected in childhood, and the anti-tuberculosis campaign had been organised on the basis that adult tuberculosis was a recrudescence of this infection. The investigations on hospital nurses which began in 1924 had changed this outlook: only half the student nurses gave a positive tuberculin reaction on joining, but practically all were positive on the completion of training. Moreover it was observed that only 1% of the positive reactors developed clinical tuberculosis whereas 17% of the negative reactors became ill with the disease. Meanwhile, in 1926, Heimbeck had started the parenteral immunisation of these nurses on a voluntary basis by giving them BCG vaccine, at first subcutaneously and later intradermally. Analysis of the results showed that of the vaccinated nurses 2·6% developed clinical tuberculosis and 0·2% died, the corresponding figures for unvaccinated nurses being 17·1 and 1·8. Attention was next directed to university students with similarly good results. Finally certain mixed groups were inoculated. At that point came the Lübeck accident when a virulent strain of tubercle bacillus gained access to the BCG vaccine and caused a number of deaths. The publicity given to this tragedy discouraged for a time the vaccination but after an interval public anxiety was allayed and the scheme went forward again. The position at the time of the Nazi invasion was that students, nurses, house contacts, works contacts, fishermen, sailors, and children of school-leaving age were being inoculated. Some reluctance was encountered in coastal and isolated districts, but apart from this the scheme had been popular. Finally, 6000 soldiers had been inoculated, this time by percutaneous inoculation. The Nazis forbade the scheme and this ensured its popularity. Some 6% of inoculations gave rise to a local abscess which took a month to heal. Over 90% of the vaccinated became tuberculin-positive, but the duration of protection is not known and superinfection by contact with tuberculous persons is not excluded.

Lieut.-Colonel C. F. BENNETT gave his experiences of Canada. Only two of the nine provinces had used BCG vaccine, of which his own province of Saskatchewan was one. This province had a very efficient general anti-tuberculosis campaign comprising: (1) voluntary segregation by institutional treatment until the lesion was closed (average period 13 months), with an allowance of 4·8 beds for every death, and no waiting-list; (2) a special tax to meet the cost of treatment which was free; (3) continuous educational propaganda so that tuberculosis was no longer regarded as inevitable or as a disgrace, but as something to be prevented, or diagnosed in its early stages and cured; (4) close liaison between the anti-tuberculosis organisation and the general practitioner; and (5) elimination of bovine tuberculosis by pasteurisation of milk. (Colonel Bennett did not think the standard of living was as important as it had been made out to be as a causative factor.) With this organisation the death-rate from tuberculosis had steadily declined and cases were admitted to hospital at a more curable stage. The infection-rate had fallen even faster than the death-rate. The incidence in 1942 was only 0·75 per 1000 population, to which mass radiography had added another 1·3. On this background BCG vaccine had been tried in two special groups: (1) Indian babies, (2) hospital and sanatorium nurses. In the latter the experience of his province had been similar to that of Norway; the negative tuberculin reactors accounted for most of the clinical cases (five times as many as the positive reactors). The vaccine had enhanced resistance by 75% and reduced breakdown in a class of the population exposed to grave risks. But it was, he thought, most unlikely that it would eliminate the need for early diagnosis and voluntary segregation.

Colonel R. S. MUCKENFUSS spoke of the experience with BCG vaccine in New York City. The work had been started by Park and on his untimely death it had been continued by Levien and others whose results were published in 1938. Children born into tuberculous households had been selected for the test. The results have not been statistically significant and he did not think they justified the general use of the vaccine.

Prof. JOHAN HOLST gave his experience with the Norwegian Army. Some 3000 men had been inoculated, but too recently to warrant definite conclusions. No serious harm had resulted from the local cold abscesses which had occurred. He thought that vaccination should be carried out 2–3 months before the men went into infected surroundings. It was difficult to fit the vaccination into this period of training, especially as the vaccine must be used fresh and was at present difficult to obtain (they had received it from Sweden). In the first year after arrival in this country the incidence of tuberculosis among Norwegian troops had been high, but it was now declining. This decline could not be attributed to BCG but to measures (such as collapse therapy) taken to prevent open-case infection. Of the groups tested, the adolescents were especially important (factory workers, sailors and students) and it was essential for the inoculations to be given 2–3 months before exposure to special risks. The vaccination should of course be associated with other prophylactic measures.

Prof. THOS. DALLING recounted his experience with experimental inoculations of cattle at the Cambridge University institute of animal pathology. Because of local abscess formation, subcutaneous inoculation had been abandoned in favour of intravenous injection. Immunity was high for the first six months after vaccination and then began to wane. It could be reinforced at six-monthly intervals, giving rise to allergy with positive tuberculin reaction, which finally fell after the series. A small field trial had been made, but the results were not yet available. A larger field trial on several thousand cattle was now being made, farms being chosen which possessed tuberculin reactors; but it was not easy to establish satisfactory control tests and the trial would take 6–7 years to complete. As the vaccinated animals reached maturity they would be introduced into dairy herds. He had also made trials of a vole-bacillus vaccine (see *Lancet*, 1940, ii, 338) which he thought had given better results than BCG. It was a harmless organism.

Dr. A. Q. WELLS described 3 cases he had vaccinated with the vole bacillus. All had become tuberculin positive. One had developed a local abscess. This bacillus did not produce progressive disease in guineapigs.

Prof. S. LYLE CUMMINS said he had started vaccination with BCG on 12 cases before the war but had abandoned it owing to official prohibition.

Dr. PETER EDWARDS (Market Drayton) mentioned his experience of the vaccine with a valuable dairy herd, in which the results were not yet complete. He was not prepared to use it in man.

Discussion then turned on the general principles of prophylactic vaccination.—Dr. M. C. WILKINSON (Black Notley) thought that vaccination should be done at the age when the reticulo-endothelial resistance of the lymphatic system is highest—viz., in late childhood.—Prof. W. H. TYTLER stressed the importance of primary infection in adolescence at the present time. This offered, he thought, a favourable opportunity for prophylactic vaccination. Calmette had not claimed that the immunity in infants was lasting. The work on infection in nurses needed more statistical control. Environment was not everything; he quoted a rural district in Wales where living conditions were appalling and the proportion of tuberculin reactors was only 2%. The undiagnosed chronic infective case was the most important factor in all schemes of prevention.—Dr. E. NASSAU (Harefield) argued that prophylaxis could not be expected to protect always. A sense of proportion was essential.—Dr. A. L. JACOBS (Paddington) thought the available data were now sufficient for assessing the value of BCG vaccination.

At the conclusion of the meeting resolutions were passed calling for a committee of inquiry into the possibility of using BCG in this country as a means of prophylaxis.

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ROYAL SOCIETY OF MEDICINE

AT a meeting of the section of medicine on Nov. 23, with Dr. GEOFFREY EVANS the president, in the chair, a discussion on

Nutrition in Enemy-occupied Europe

was opened by Lord HORDER. Facts, he said, could be learned from the reports of qualified observers in the occupied countries; from examination of recently arrived refugees; and by considering the known rations allowed.

Colonel W. E. VIGNAL, MD, said that the intimate connexion between health conditions and food in France was shown not only by reports but also by a special minute which had been prepared by the Minister of Agriculture for the German authorities only. Few people could obtain normal quantities of food: the meat ration was 3½ oz. with bone, and even this was theoretical because of breakdowns in transport. The daily basic ration yielded 1084 calories for most people in France. German authorities estimated the minimum calorie value for health at 3000 calories; towards the end of the last war, when the German ration fell to 1600 calories, they called it semi-famine. Moreover the French diet was deficient in fat, protein, and sugar. There was little protective food, causing a general weakening of the organism. Tuberculosis was increasing alarmingly, and the German authorities were enforcing complete silence about it. The Vichy Minister of Health stated that 35,000 of the inhabitants of the Seine Department were affected, and the number of young women patients was especially high. In one department the positive-sputum rate was nearly three times that of 1938. One report said that the ill-balance of the diet was more responsible than an absolute deficiency. The Germans had returned to France a large number of tuberculous prisoners, most of them urgently needing treatment; six weeks later they had been sent to their homes, to constitute a permanent source of infection. Increasing numbers of workmen were returning to die of tuberculosis after a few months' work in Germany. France was now largely deprived of her sanatoriums and supplies, and patients had to wait six to eight months for institutional treatment. Acute bronchopneumonic types were common—and so was rapid wasting ending in death. In 1942 there had been 234,000 deaths. The general weakening revealed itself in many other forms; sudden deaths without apparent cause or from minor ailments were ascribed to deficiency in sugar and vitamins, especially B. Emaciation was the lot of all workers, and in some the loss of weight was catastrophic. The accident-rate had greatly increased. Many people suffered from a progressive asthenia and incapacity for effort, dizziness, retro-orbital or temporal headaches, night sweats, loss of memory, apathy followed by irritability and depression. The only clinical signs were low blood-pressure, loss of weight, hypoglycæmia and ascorbia. Other observers had described severe malnutrition syndromes, with and without œdema. The difficulty of finding food was begetting a vindictive and grasping mentality which augured ill for the future. The soap shortage made hygiene difficult; delousing and disinfecting posts had been installed to combat new infections carried by fleas and lice. Fortunately there had been only a little sporadic typhus. The condition of children was even more alarming: they showed loss of weight and a high incidence of tuberculosis; 90% of one group studied were 2–9 kg. underweight. Psychological disturbances were common and included inability to concentrate, enuresis, pilfering, psychological lying and epilepsy. The number of children coming before the criminal courts was increasing. Rickets was common and severe. The neonatal death-rate was high; many premature children born at the eighth month had the blood-picture of a fœtus of six months. The birth-weight was decreasing and the miscarriage-rate increasing. Women could no longer feed their children, owing to exhaustion and decalcification. Charles Richet had been imprisoned for asserting that ten million persons in France were suffering from hunger and two million of them were likely to die.

UNDER-NUTRITION IN GREECE

Dr. A. P. CAWADIAS said that in Greece the Red Cross was on a war basis like the fighting services. The prodromal period of the famine lasted from 1939 till the fall of the country in May, 1941. Greece produced scarcely any food; most Greek wars had been wars for food, and the modern population relied on monthly shipments by sea. As soon as shipping became restricted, there was a state of malnutrition, which became much worse when Greece entered the war and all available food was diverted to the fighting men. With the fall of Greece the problem became acute; there was then no food in Greece. The confidence and fighting spirit of the country kept people going through the summer when something could be found in the countryside. The daily bread ration was 1 oz. In October real famine began. As usual with famine, the tragedy burst suddenly. Communal kitchens gave 400 calories a day, when they could, and fed 500,000 people. Well-to-do people in Athens had 1 oz. of bread alternate days, camomile tea and gruel, with oil and carrots, and chicory coffee. A thousand died in Athens every day of sheer starvation. Refuse lorries were loaded with bodies, thrown in pell-mell like sacks of cement. Sausages of dog, rat and cat meat were sold at outrageous prices. In six months 400,000 died. First of all to the rescue came the Greek Red Cross. The heroism of starving women of the upper classes, working for the Red Cross, was as unforgettable as that of the soldiers and sailors. Then the international Red Cross gave its guarantee, despite the difficulties of control. The British Government and the United States Government joined in, and, without any interference from the occupying authorities, began to feed Greece. That ended the tragic period, in March, 1942, and then began a nine-months period in which the calorie intake went up from 400 to 750 calories. From January, 1943, conditions had deteriorated; 32% of the necessary calories only were supplied, and all the hidden food and money in the country had been exhausted. The mortality was terrible; they had ceased bothering about tuberculosis, but now the incidence of malaria was 100% in endemic areas and hunger œdema and other nutritional diseases were spreading. The machinery for relief was ready and there were no quislings in Greece.

JUGOSLAVIA

Dr. M. SEKULICH said that peace-time nutrition in Jugoslavia was dependent on meat in towns and vegetables in the country. The urban diet had adequate calories. The peasants ate meat in the winter and supplemented their vegetables with dairy products. Nutrition was not satisfactory because a third of the peasants ate bad bread, and a small number of people ate more than they needed, and most of the population consumed more than they produced. Generally speaking, rural children were underfed, even in self-supporting and surplus areas. Tuberculosis was found everywhere; bad housing was largely responsible. In enemy-occupied Jugoslavia there was a steady shortage of food; the enemy had taken all stores, and the peasants had destroyed food to prevent it falling into enemy hands. The army of occupation had to be fed, and the harvests of 1942 and 1943 had been small for many reasons. The shortage of draught animals, guerilla warfare, enforced transplantation of the population and change in use of the land by enemy order all combined to reduce the average calorie value by about half. There was both malnutrition and famine. All the consequences of malnutrition in peace-time were increasing from day to day. Two normal prewar harvests, with adequate transport, would restore prewar conditions.

BELGIUM

Prof. J. YOUNG, FRCOG, quoted a paper by Professor Heymans, of Ghent, which reached this country. The author had had access to official data and had suffered severely from the Nazi authorities as a result of publishing this paper. The daily basic ration in 1942 was 1230 calories—i.e., it was 50% efficient. Certain classes were allowed supplementary rations, but although rations were adequate for the youngest children they became worse as age advanced. A loss of weight of 10–15 kg. was common. A striking fall of plasma proteins appeared even without loss of weight. Primiparæ gained only 81% of the prewar weight figure and multiparæ 78%. Tuberculosis was a grave problem; supplementary rations were issued after a strict examination, and

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the number increased from 69,000 to 88,000 in 1942. Admissions to sanatoriums, death-rates and sputum tests showed the same increase. The latest figures were peculiarly disturbing.

Dr. IZOD BENNETT hoped that no English man or woman present would lose an opportunity of bringing home to their fellow countrymen the appalling situation of starving Europe. He emphasised Colonel Vignal's reminder that the Germans proclaimed to the world in the last war that 1600 calories a day was semi-starvation and were now allowing to the peoples of Europe 1000–1100 calories a day—if they could get it. He hoped that doctors would insist that calories were wanted—not vitamins. He had a fearful mental picture of ships loaded up with little capsules—when food was wanted. It was generally agreed that if you looked after the calories the vitamins would look after themselves. A vitamin given as a natural food achieved far more than a synthetic concentrate. Malnutrition was now a chronic problem, not an acute one; people were suffering from under-nutrition which had gone on for two, three or four years, and they must be given ample nutrition over a considerable period before they could approach normal health. A young Frenchman arriving in this country a fortnight ago had looked round at the dock workers and exclaimed "I suddenly realise that two years ago we were men like that!" The supplementary ration must be rich in first-class protein and vitamin-containing fat. Only thus could the lives of the young, the pregnant and the early tuberculous be preserved. Of all the epidemic diseases threatening Europe today tuberculosis was the major one. When refugees and prisoners returned from forced exile they would be riddled with it, ready to distribute it among the urban populations of their own lands. Some sieve must be devised to prevent this; at this moment the authorities should be actively preparing mass miniature radiography sets for Europe. Such sets offered the one hope of preventing widespread epidemic. Clinical and pathological examination was impossible; an expert physician or bacteriologist could deal with no more than 50 cases a day. Ordinary radiology could be used to diagnose 200 cases a day—mass radiography, over 500. British scientists might save many lives by getting in touch with scientific societies among the allies.

BRITAIN

Dr. G. MARSHALL felt a little relief that the figures for tuberculosis in occupied countries were no worse. We must begin by finding out how to tackle the problem at home. Tuberculous meningitis had increased by over 200%. Many had died who would not be expected to die in times of peace, and nobody quite knew why. This was a time for research and for increased instead of decreased facilities for treatment. We did not know what supplementary rations patients required. The results of treatment now were not as good as in times of peace.

Other speakers insisted on the need for determining the precise effects of dietetic supplements.—The PRESIDENT agreed but pointed out that the increase of tuberculosis was only 10–12% in England and Wales, 20% in Scotland, whereas in France it was 30–40%, in Belgium 60–65%, in Jugoslavia 100%.

General SICE described the tuberculosis found in escaped Frenchmen as very severe and rapid, fatal in 5–7 weeks. He thought it was associated with a special form of the bacillus.

Reviews of Books

Medical Clinics on Bone Diseases

A Text and Atlas. I. SNAPPER, MD, formerly professor of medicine, Peiping Union Medical College. (Lewis. Pp. 225. 67*s.* 6*d.*)

IN 1937 Professor Snapper gave two lectures in London on pseudo-tuberculosis in man. In the first he described Boeck's disease and in the second regional ileitis. He published them in Holland, in 1938, in a monograph illustrated by plates the beauty of which has never been surpassed: each measured 11 by 8 in., was of the consistence of a thin card, and had a magnificent glossy finish. The text was in English. Those interested soon discovered a companion volume, published in 1937, with the title *Ziekten van het Skelet*, which described hyperparathyroidism, Paget's disease, lipoidosis of the skeleton, and multiple myeloma. The text was in Dutch, and the illustrations of the same surpassing quality. In an extended form, enlarged by 25 pages and enriched by 8 extra plates, this monograph now appears in English. The added section describes Professor Snapper's experience in China of avitaminosis D, comprising fœtal rickets, infantile rickets, late rickets, and osteomalacia. No more complete description of generalised diseases of the bones has appeared in any language. The treatment is thorough; in each section, he deals with the history of the subject, clinical findings, radiological appearances, biochemistry, pathology, and differential diagnosis, and current English descriptions of these diseases are put to shame. Perhaps at last English teachers will cease to perpetuate Paget's view that the skull and the tibia are the commonest sites of osteitis deformans. Snapper agrees with Schmorl that the bones are affected in the following order of frequency: sacrum, spine, femur, cranium, sternum, clavicle, tibia. His original contributions to the subject of bone diseases include his discovery that the Hand-Schüller-Christian disease can occur in the absence of a craniohypophyseal lesion, and the fact that the biochemistry of multiple myeloma differs from that of hyperparathyroidism in the high level of phosphorus in the blood. His occasional misconstructions of English nowhere alter the sense but rather add relish to the text. The 30 exquisite plates include X rays, clinical photographs, and photomicrographs of histological sections. Each chapter is followed by an extensive bibliography; that for hyperparathyroidism alone contains nearly 200 references.

Physiological Basis of Medical Practice

(3rd ed.) CHARLES HERBERT BEST, MD, D SC; NORMAN BURKE TAYLOR, MD, FRS. (Baillière. Pp. 1942. 55*s.*)

ONCE upon a time the medical student based his medicine (or at any rate was told to do so) on what he saw in the post-mortem room. The results were good but limited, for he came to believe that diseases which produced no post-mortem changes were imaginary, or, as he was taught to call it in the jargon of the wards, "functional." He often forgot the real meaning of "functional," which acquired the fixed epithet "only." Nowadays attention is turning more towards the diseases that are "only functional" and students are allowed to know that many genuine disorders leave no anatomical changes should death occur in their early stages. The stress is leaving morbid anatomy in favour of physiology, a knowledge of which is necessary not only for the diagnosis of disorders of function but for the proper interpretation of the symptoms of "organic" disease. It is to meet this new demand that such books as this were made. First published in 1937, "Best and Taylor," despite its great girth and price and the accident of war, has reached a third edition. Clear and comprehensive, it holds a just balance between pure and applied science. Any man who teaches the practice of medicine needs it at his elbow.

Minor Surgery

Editors: Sir HUMPHRY ROLLESTON, BT., MD CAMB., FRCP; ALAN MONCRIEFF, MD LOND., FRCP. (Eyre and Spottiswoode. Pp. 174. 16*s.*)

THE editors have made wide and wise choice of subject matter, this little book includes the special branches—eyes, ears and gynæcology—as well as general surgical procedures. The various articles have been reprinted and revised from the *Practitioner*. Several of the authors rightly maintain that minor operations demand no less skill than major operations, and their advice, gained from wide experience, informs the descriptions of the most elementary operation. Modern methods of treatment are fully described, and their advantages and disadvantages assessed. The book is quickly and easily read; practitioners in all branches would do well to read it.

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THE LANCET

LONDON: SATURDAY, DECEMBER 4, 1943

THE NURSE IN CHARGE

DOCTORS at work are not often members or leaders of teams. In student days, the unit or firm of clerks or dressers, house officer, registrar and chief, does admittedly take some of the rough edges off our individuality. But though the chief may chasten those he loves, registrar and house-surgeon are usually sweet-tempered. And the team is temporary; students move on after three months, and even the stay of registrars is limited. Most doctors, then, never experience life in a rigid hierarchy from which there is no escape unless armed with a testimonial from the man on top. In other walks of life however the team is a common working unit, and its happiness and efficiency depend on the recognition that obligations are incurred by those invested with leadership. The Army officer who is worth his salt does not eat or sleep until he is satisfied about the comfort of his men. The superintendent of the telephone exchange must watch over the health and happiness of her girls with a quasi-maternal eye. And the factory welfare officer is a symbol of the recognition by the bosses that contented workers work best.

Nursing is as rigid a hierarchy as is to be found in democratic society. The conduct and behaviour of the nurse, at each stage of her career, is reported on by her superior, and on these reports the matron must base her assessment and her testimonial. Orders are issued from which there is no appeal. "Her's not to reason why" is still the general rather than the exceptional attitude forced on the probationer. As a result, girls with individuality and initiative tend not to find their way into nursing, while those who do so lose something in their passage through the mill. There are many sisters and matrons who retain their humanity in their journey to authority; but there are others who do not. A sister has two families to care for, her patients and her nurses, not to mention her doctors, and the kindness lavished on the sick may leave little for the subordinate. Then, again, the charming manners which impress the lay committee are sometimes only one facet of a personality which seeks power by the easy road rather than lasting satisfaction by the hard path of service to all. At all events, there are few hospitals which cannot claim at least one sister whose ward is a byword.

One of the unhappy results of the exaggerated respect enjoyed by the nurse in charge is the fear which many junior nurses have about reporting sick. A feeling of malaise and fatigue, unaccompanied by a spectacular rise in temperature, is all too liable to be treated as a trifling disorder, unworthy of a nurse, and certainly unworthy of medical attention; yet it is precisely these symptoms which may be the earliest sign of tubercle. Moreover it is a short-sighted tradition, for patients no less than staff, which counts it creditable to carry on with a heavy cold. The problem is to know how the nurse in charge can be converted into someone who cares for her staff no less diligently than for her patients. There are hospitals where the nurse who does not eat her breakfast is forbidden to go on duty, and the one who looks seedy on duty is sent off again forthwith. But this is the exceptional viewpoint and a difficult one to maintain when patients must be nursed on a starvation ration of staff, and by a team in which the raw student nurse counts as a unit and not as a supernumerary. Present standards of hospital staffing, which work everybody to capacity all the time, and meet extra claims by achieving the impossible, need revising before a nurse can report sick without uneasiness. Probably there is no simple solution. Committees of junior nurses, staff nurses, and sisters, with power to make representation to hospital boards, are likely to infuse something of the new spirit that is needed. Careful psychiatric selection, both of probationers and sisters, would offer a second line of approach. A return of the married woman to nursing, not necessarily as a subordinate, but as a sister working regular daily hours and living out, might help to ventilate the cloistered atmosphere; and indeed the atmosphere itself might change if all qualified nurses had the option of living out. Finally, there is much to be said for a short course in staff management for all nurses who aspire to take charge of others. Then at least those who inspire fear because they do not know how to inspire respect will have the opportunity to dispel their ignorance.

NEUROSURGERY IN AFRICAN WARFARE

NAPOLEON was fond of saying, "Don't fight your enemy too long, he will begin to understand war." Last week at the Royal Society of Medicine Brigadier HUGH CAIRNS unfolded a remarkable story of the evolution of the neurosurgical services in response to the changing needs of mobile warfare. Considerable credit for such triumphs is due to the Army medical directorate for their vision and alert pliant control. At the beginning of this war it was realised that there was no place for the "gipsy" specialist roaming from hospital to hospital, and segregation of head injuries was decided on. The neurosurgeon insisted that he was but a poor thing unless equipped with his full armamentarium. He had to have a sucker, diathermy and adequate lighting, otherwise the surgery degenerated into a higgledy-piggledy affair. Special vehicles thus equipped were planned and constructed; but in France they were captured before their worth had been tested. ASCROFT,[1] fully equipped, was now sent to the Middle East. At first he worked in the forward areas, but he soon found that, owing to the difficulty of segregating casualties in the very forward areas, only 10% of those reaching him had head injuries. It was therefore decided to base the neurosurgical team behind the general hospital; this meant a delay in the primary operation of quite 48 hours, but even so the results appeared to make it well worth while for the patient to wait for such special services. Among ASCROFT'S cases, the fatality-rate where the dura had not been pierced was 1·5%; where the dura had been pierced it was 15%. But a disquieting feature was that one out of four (75 out of 293) of the penetrating wounds developed brain abscess.

With the break-through at El Alamein, the lines of communication became so long that KENNETH EDEN,

1. Ascroft, P. B. *Brit. Med. J.* 1941, i, 739.

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who was now in charge, split his neurosurgical team and himself went forward. To the original team equipment he added an operating-theatre built within a captured Italian motor coach, as described in his posthumous paper on our opening page. It says much for the general medical organisation that EDEN was able to operate on 188 out of the 293 head injuries within 24 hours of injury, and that only in 34 were the wounds more than 3 days old. Primary healing was thus obtained in over 90% of cases. The lowered incidence of infection as a result of getting such cases early is well reflected in the fall of serious complications. CAIRNS gives 3·4% as the incidence of intracranial infection in EDEN'S cases. In ASCROFT'S "late" cases the case-mortality due to infection was 10·8%; in the last war CUSHING'S case-mortality due to infection was 36·5% and death was then usually due to a rapid meningitis rather than to late abscess formation. This lowered incidence of sepsis, CAIRNS points out, is important not only from the point of view of immediate complications but because of its effect on the subsequent development of traumatic epilepsy. ASCROFT,[2] after a thorough study of Ministry of Pensions records of the last war, concluded that long-continued wound sepsis, whether the dura was preserved or penetrated, favoured, and was closely related to, the onset of traumatic epilepsy. It is an important fact, therefore, that EDEN obtained 97% primary healing in a series of 139 scalp wounds. EDEN found no place for first-aid operations, but there is probably a need to sterilise such external wound surfaces early; for CAIRNS brought bacteriological evidence to show that in most brain wounds infection starts in the superficial layers of muscles and then spreads inwards. *Staphylococcus aureus* was the predominating infecting organism, and sulphonamides alone will not control this, though it is reasonable to give them credit for the relative absence of streptococci. The Russians too, CAIRNS recalled, found their brain wounds infected—only 2 out of 300 were sterile. CAIRNS and others have used penicillin in wounds over 72 hours old, and the results were encouraging. Penicillin is the most powerful bacteriostatic agent that we have against the infecting *Staph. aureus*; very little is required in the head cases and it is hoped that it will soon be fully available. As FLOREY [3] has pointed out, its correct place is in the wound early, in the form of a penicillin and sulphonamide powder; a first-aid operation to get the penicillin into the very depths of the wound may become necessary. CAIRNS also reports that, contrary to Russian experience, clinical gas-gangrene of the brain has not been seen in the Middle East, though clostridia had been found disporting on the surface.

The immediate postoperative mortality in the penetrating wounds reported by EDEN was 25 out of 102 cases; 18 out of the 25 died within 24 hours from the initial brain damage. Coma came to be regarded as a serious prognostic sign, and it is to be noted from his figures that of the patients who died half were in coma. A third of all the head injuries had other associated injuries, and coöperation with the general surgeon and ophthalmic surgeon was important. The orbital injury often had an associated brain lesion, and EDEN recommends suturing of the lids after removal of orbital contents. In the sinus-brain injury (with its grave risk of meningeal infection) he repaired the dural defect with a free fascia graft. This however usually necessitates an extensive operation, and CAIRNS reported that SCHORSTEIN (who was attached to the First Army) has obtained good results by packing with soft-paraffin gauze. The dura was not closed, which is rather different from the German practice [4] of cutting "postage stamps" from the external dural layer or turning in pericranial flaps to close the defect. Where the sagittal sinus had been injured EDEN was able to control the hæmorrhage by silk suture over muscle grafts; CAIRNS gave the very useful tip of raising the head (sitting the patient up). The neurosurgeons prefer sulphadiazine by mouth or its sodium salt intravenously. EDEN regularly dusted the brain with sulphathiazole, and CAIRNS reports that this was not followed by epileptiform seizures as described by WATT and ALEXANDER.[5] EDEN insists on full closure of the entire scalp wound, and makes use of extensive flap-sliding incisions. His cases were evacuated by air within 2–3 days and they all travelled well. With the poet the patient may well say "Now that the work is smoothly done, I can fly and I can run." All men with scalp wounds were back on duty in from 10 days to 3 weeks; the rest of the follow-up is not yet complete, but we learn from ASCROFT'S figures that quite 70% of head wounds (516 cases) returned to full duty.

Will the few neurosurgeons at present available be able to deal with all the casualties expected in the future? The essential function of the neurospecialist, ASCROFT declares, is to deal with the difficult case. The technique of acute traumatic brain surgery is well within the competence of the general surgeon, and it is to be regretted that it is the fashion of the hour to make a scapegoat of him: no general surgeon would deliberately leave locks of hair, bricks and other debris within a wound. Neurosurgery, however, has developed a very specialised technique, and its thoroughness and leisureliness appear to the general surgeon somewhat pernickety; he does not see the need for all the fiddle-faddle. For answer the neurosurgeon can point to his own results. There is only one way to learn this technique and that is at the operating-table. It is to be hoped that the EMS and other Services will make such practical teaching possible.

CORONER AND DOCTOR

WE published last week a summary of an authoritative legal opinion on the important question of the possible obligation of medical practitioners to report to the coroner the death of a patient. That doubts should have existed is the natural result of the incredibly untidy condition of the law, whereof an optimistic maxim forbids us to plead ignorance. The layers of statutes governing the recording of births, deaths and marriages go back to 1836 and have long cried aloud for simplified restatement. It is not surprising that popular understanding should be tempted to confuse the registrar's duty to report certain deaths to the coroner with the practitioner's duty to certify the cause of death. It is reassuring that solid authority should confirm the statement, set

2. *Lancet*, 1943, ii, 211.
3. Florey, H. W. see *Lancet*, Nov. 20, 1943, p. 638.
4. See Cairns, H. and Guttman, E. *Bull. War Med.* 1943, 9, 477.
5. Watt, A. C. and Alexander, G. L. *Lancet*, 1942, i, 493.

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out in 1927 in the *Conduct of Medical Practice*, that neither under the act of 1926 nor any other act is there any legal obligation upon the medical man to inform the coroner. The earliest operative words in the Coroners Act of 1887 are "When a coroner is informed"; the coroner is not put upon inquiry until he is informed of the death. The existence of a legal duty may be tested by the evidence of its enforcement. Is there any precedent for the prosecution of a practitioner for the supposed common-law misdemeanour of failing to report a death to the coroner?

Deaths in certain particular circumstances—e.g., in prisons, asylums or inebriate homes—cast a special statutory duty upon persons in charge. Otherwise it is clear that Parliament deliberately made notification the responsibility of the registrars of deaths. As is well known, the registration regulations of 1927 require the registrar to tell the coroner of the following deaths before registering them: those where the deceased was not attended by a registered medical practitioner during his last illness or where a duly completed medical certificate in the prescribed form is not forthcoming; those reasonably believed to be unnatural or due to accident, violence or neglect, or attended by suspicious circumstances, or due to some cause apparently unknown; those due to abortion and certain specified diseases, particularly various forms of poisoning; those occurring after "an operation necessitated by injury or occurring under an operation or before recovering from the effects of the anæsthetic"; those where the deceased was apparently not seen by the certifying doctor either after death or within 14 days beforehand; and lastly those alleged stillbirths where there is reason to think the child was born alive. Notification of the coroner in these instances does not, of course, mean that an inquest will inevitably follow.

Coroner and practitioner alike desire that all necessary inquiries should be undertaken and completed with the least possible discomfort to the public. The coroner may request, though he cannot require, that certain deaths (for example, those taking place in hospital within 24 hours of admission or within 24 hours of administration of an anæsthetic) be reported to him by the medical authorities; but he generally does this because he is aware that it is the relatives who suffer by uncertainty and delay. Prompt reports from hospitals may spare anxiety to the family of the deceased; the relatives are occasionally pained by the coroner's interruption of their arrangements for the funeral. As was well stated in the letter published last week, medical practitioners (like other members of the community) have social, public and moral duties, not enforceable by law, to assist the coroner. In the past they have collaborated harmoniously for the public good. The very existence of the uncertainty lately emphasised is remarkable evidence of the reasonable spirit mutually displayed between the medical profession and that ancient office of coroner which the profession at large has as little desire as the rest of the community to see abolished.

Mr. BASIL GRAVES will talk on the cult of the eye and the quest of reality at the Royal Eye Hospital Clinical Society on Friday, Dec. 17, at 4.30 PM.

Annotations

CHEMOTHERAPY IN ACUTE OSTEOMYELITIS

SINCE sulphathiazole was introduced there have been a good many isolated case-records of acute hæmatogenous osteomyelitis treated with this drug, but until recently no adequate series has been published. To assess the effects of chemotherapy in osteomyelitis is difficult because there are generally two separate conditions to be considered—the staphylococcal septicæmia and the bony lesion. A drug may affect the one and not the other. Butler,[1] reviewing 500 cases untreated by chemotherapy, found a mortality of 25%. The cause of death was always staphylococcal septicæmia and the death-rate was uninfluenced by the type of operation; but of 31 cases in which no operation was performed, because the patient was considered too ill for it, 26 were fatal. To lower the mortality of this disease sulphathiazole must be able to deal with a severe blood infection. The severity of the infection, and the prognosis, can be judged on the results of repeated quantitative blood-cultures: Valentine and Butler[2] showed that of 17 patients whose colony counts rose to over 30 per c.cm. of blood only 3 lived; 5 of the 17 received sulphathiazole, but all died save one. Of 12 patients whose colony counts were under 20, all but 2 recovered, though only 2 had sulphathiazole. Similar figures are given by McLellan and Goldbloom.[3]

Robertson[4] now records 89 cases of acute hæmatogenous osteomyelitis with only 4 deaths. Blood-culture estimations are not given, so it is impossible to assess the severity of the infections, but the series provides one of the lowest death-rates yet recorded for the disease. Robertson believes that operation is hardly ever required and supports this claim with an account of 25 cases treated with sulphathiazole alone, despite the fact that some of them developed sinuses. He does not approve of immobilisation and uses no splinting of any kind save extension where the joint is infected. In his experience sulphathiazole given early in the disease and in adequate dosage (8–10 grammes daily) not only lowers the mortality, but also limits the bone infection. McKeown,[5] who has concentrated on the effects of sulphathiazole on the bone lesion, found in a small series of 25 cases that the best results came from adequate chemotherapy reinforced by drilling the infected bone. He maintains that with this treatment he was able to cut short the illness and to get a better final result than with cases untreated by chemotherapy. Like Robertson, he emphasises the necessity for using sulphathiazole soon. If it is given when infection is well established in the bone no clinical improvement can be expected.

DETENTION BARRACKS

AFTER the trial of two warrant officers for the manslaughter of Rifleman Clayton, the Prime Minister appointed Mr. Justice Oliver, the Bishop of Reading and Lord Moran, FRCP, to inquire into the treatment of men under sentence in naval and military prisons and detention barracks. The committee, on which Dr. H. E. A. Boldero served instead of Lord Moran, have issued a frank and useful report which admits deficiencies, especially earlier in the war, but expresses the opinion that men in detention are not now exposed to calculated brutality. A certain amount of shouting, "chasing," and bad language is still encountered, and the committee discuss the awkward problem of finding the right kind of staff. The present medical arrangements on the whole impressed them very favourably. In some places separate accommodation for the mildly

1. Butler, E. C. B. *Brit. J. Surg.* 1940, 28, 261.
2. Butler, E. C. B. and Valentine, F. C. O. *Lancet*, 1943, i. 194.
3. McLellan, N. W. and Goldbloom, A. *Canad. med. Ass. J.* 1942, 146, 136. 4. Robertson, D. E. *Ann. Surg.* 1943, 118, 318.
5. McKeown, K. C. *Brit. J. Surg.* 1943, 31, 13.

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ill is needed because they lie in their usual beds. It would also be best to have a whole-time medical officer for each detention barracks, but the shortage of doctors is an obstacle to this, and special aptitude for the work is important. The onus on the medical officer would be lightened "if days spent comfortably in hospital did not count towards the completion of the sentence." Changes of medical officer have sometimes been far too frequent, but "it would not be right to keep a young man at this work year after year." The committee's strongest criticism of military institutions is made against the sanitary arrangements at most of those they visited: the men may be locked in their sleeping rooms from 4 or 5 PM onwards with no sanitary facilities except buckets which cannot be flushed; and for prisoners in cells more latrine parades are needed. Their sharpest comment, however, is reserved for naval detention quarters, where "the discipline and general life of offenders are in many respects far harder even than in the military prisons." During his entire sentence the sailor has no communication at all with his fellows; for at least a fortnight he has to lie at night on bare boards without blankets (except in cold weather) and may neither send nor receive letters. In the Navy, moreover, little seems to be attempted towards occupying the men's minds and improving their characters while undergoing detention. In all the Army establishments there is at least one education room, and often an information room as well, with cuttings from the illustrated papers, war maps and so forth; the cinema and wireless are used for educational purposes, and commonly there are regular courses of lectures on current topics, with brains' trust meetings. Welfare services are also valuable, but tend to come too late. The committee remark that if the Adjutant-General's admirable notes on *The Soldier's Welfare* were fully carried into effect, particularly by company and platoon officers, perhaps as many as half those now under sentence would never have been committed to detention.

IMMUNITY TO TRICHINA

THERE has lately been a good deal of discussion on the stage of infestation with *Trichinella spiralis* at which immunity is developed by the infested person or animal. Is it during the phase when the adult trichinæ are harboured in the intestinal canal, or when the larvæ migrate throughout the body and encyst in the muscles? The work of Roth[1] seems to indicate that intestinal infestation alone may suffice to confer a persistent immunity of more or less pronounced degree to reinfestation. This he attained by feeding guineapigs with larvæ of one sex only, preventing therefore the reproduction of the adult worms and the dissemination of daughter larvæ into the guineapig's body. Guineapigs thus treated later survived a lethal dose of infective larvæ of both sexes and showed in the muscles considerably fewer encysted worms than the control animals. The differentiation of male and female larvæ[2] although rather difficult and tedious is quite feasible and apparently successful in most cases. Others[3] have shown that immunity can be acquired not only actively by means of a sublethal dose of the infesting agent but also by parenteral introduction of trichina antigen and by passive transfer of immune serum. Immune bodies produced by metazoa like trichina, as in the case of bacteria and protozoa, are associated with the globulin fractions of the serum.[4] An interesting feature noted in some of these investigations was the response occasionally arising in immunised animals after the reinfesting dose. This response appeared to be of an anaphylactic type with symptoms of "allergic enteritis," often terminating in the death of the animal. The hypersensitive immune response to the trichina substances has apparently been observed also in human beings.[5] This has to be borne in mind in view of the fact that a certain proportion of the population both here and in America are known to have suffered from subclinical infestation with *Trichinella spiralis*[6] and skin tests have shown[7] that they carry antibodies against trichina antigen.

1. Roth, H. *Amer. J. Hyg.* 1943, 38, 99.
2. Bugge, G. *Arch. wiss. pfakt. Tierheilk.* 1934, 68, 24.
3. Culbertson, J. T. *J. Parasit.* 1942, 28, 197.
4. Mauss, E. A. *Amer. J. Hyg.* 1941, 34, 73.
5. Bercovitz, Z. cited by Culbertson.
6. Meleney, H. E. *Amer. J. Hyg.* 1941, 34, 18.
7. Shapiro, M. M., Crosby, B. L. and Sickler, M. M. *J. Lab. clin. Med.* 1938, 23, 681.

EXPLAINING MENTAL ILLNESS

EVERY psychiatrist and indeed every doctor has to explain to relatives what mental illness and admission to a mental hospital really entails. It is a difficult task, but the rewards for executing it well are great. Often however those to whom the explanation and reassurance are addressed are too deeply stirred, or too much influenced by common prejudices about insanity, to be able to grasp what has been told them; often, too, the doctor lacks the time, and perhaps the skill, to allay all their fears and doubts. Mrs. Stern's book[8] will, to a great extent, fulfil the task for him. It is so arranged that the successive stages and problems which will confront relatives are dealt with seriatim. The first few chapters cover the attitude towards mental illness, the need for hospital treatment, desirability of a public or a private hospital for the patient, procedure of admission, getting the patient to the hospital, and the first few weeks there. The latter part of the book describes life in the mental hospital and gives advice about letters, visiting, parole, attitude after discharge from hospital, and finally about the responsibility of all citizens for the mental health services in their community. Medical details are eschewed; there are no descriptions of symptoms, helps to diagnosis, or names of diseases. Here and there differences of an unessential kind between American procedures and ours will occur to the English reader, but they do not reduce the great usefulness which such a manual could have in modifying the attitude of the public in this country and lessening the avoidable misery incident to mental illness. Sensible, clear, unsentimental and humane, the book is a model instrument of public health education. It would be a very suitable use of the funds and influence of the National Council for Mental Hygiene if it could subsidise or otherwise promote the publication of the book here, where it is at present virtually unprocurable.

8. Mental Illness: A Guide for the Family. Edith M. Stern. Oxford University Press. Pp. 134. 6s.

SOCIAL REFORM IN CANADA

OUR Canadian correspondent last week referred to plans for social security in Canada. A committee appointed by the Canadian House of Commons has been considering a general report on social security, prepared by Dr. L. C. Marsh, and a report on health insurance containing the drafts of Dominion and provincial bills to establish universal health insurance and improved public health services.[9] The medical profession in Britain will be particularly interested in the parts of the scheme relating to medical and sickness benefit. For the extension of medical services the Canadian planners rely chiefly on the insurance principle and insurance machinery. Health insurance, including medical benefit, will be mainly self-supporting. All insured persons and their dependent children will be entitled to medical, surgical and maternity benefits, dental benefit, pharmaceutical benefit, hospital benefit and nursing benefit; these are expected to include adequate measures for the prevention of disease and all necessary diagnostic and curative procedures. The scheme also embodies important measures of occupational readjustment—

9. Summarised in Social Security Planning in Canada, International Labour Office, Montreal, 1943 (obtainable from the branch office of the ILO: 38, Parliament Street, London, S.W.1).

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placement, guidance and training facilities. Here Canada starts with certain assets: the enlarged range of pre-employment classes, accelerated teaching for skilled men in the Services, supervisory training schemes, and spare-time vocational education courses may all be adaptable to postwar use.

Under the new scheme the contribution to be paid by insured persons will not be the same everywhere but will vary according to varying territorial needs. As regards cash benefits the Marsh report adopts the view of the International Labour Office that the benefits—and the contribution correspondingly—should be proportional to earnings, amounting to 50% of wages for single persons and 75% for married persons in the lower categories. The income of the worker in times of sickness thus preserves a relation to his normal budget; whereas a flat rate tends to give relatively more to the lower-paid and less to the better-paid worker. The proposed Canadian legislation provides for free choice of the doctor (or group of doctors), dentist, pharmacist, and even hospital, among those covered by the insurance scheme. Here as elsewhere the plan retains the flexibility of administration which is important to any progressive scheme of social security. The remuneration of doctors and dentists is not definitely set out by the reports and the draft bills; but the three main alternatives are left open—the capitation fee, the salary, and the fee for each service rendered. In many respects the scheme closely follows the suggestions of the International Labour Office. Those interested in social legislation may recall that it was Ontario, some 30 years ago, that gave the world one of the most efficient and smooth-working compensation schemes for industrial injuries, replacing the British system of judicial administration through the courts by a system of workmen's compensation boards.

POISON PEN

THE mentality of writers of anonymous letters has not received the scientific study it deserves. Dr. Letitia Fairfield suggested to the Medico-Legal Society on Nov. 25 that such study would help us to confront the whole question of criminal responsibility. Her material came from the newspapers of the last twenty years. Her tentative classification was into informers making specific charges; writers with grievances to avenge, real or imaginary; pathological busybodies, inherently cruel and the stuff of which antisemites are made; and the authors of those multiple and libellous missives which constitute the "poison-pen" epidemic of the popular press. In the first three groups men predominate, in the fourth women; but the age-incidence does not suggest any sinister influence of the physiological landmarks. The allegations are chiefly characterised by erotic phantasy, as though a flood of indiscriminate malice had been let loose. The discrepancy between the contents of the letters and the outward character of the writer is often astonishing. Dr. Fairfield thinks it a mistake to suppose, because of the obscene and erotic content of letters, that the basis of the writer's conflict is necessarily sexual, or that a repression of normal instincts is the fundamental cause of the trouble. Psychological analysis may certainly reveal unwise repression of adolescent curiosity, or homosexual or sadistic trends, but there also exists a split in the personality, deriving primarily from fantasy building. If evil thoughts are nourished and woven into daydreams they may acquire an autonomous personality which directs the person's life against his ordinary will. But such loss of control only comes if the person has at some stage deliberately accepted the wicked sentiments with his will, which according to T. K. Oesterreich and others is the very core of his personal being. Here, says Dr. Fairfield, lies the crux of the whole question of criminal responsibility. The English law holds a village laundress equally responsible for laundry bills and obscene libels unless she can prove she did not know what she was doing. The theory of two complete personalities each unaware of the doings of the other, according to Dr. Fairfield, has been accepted much too easily and certainly does not fit the poison-pen. True amnesia is always marked by a break in consciousness, of which anonymous-letter writers never complain, and which their cunning attempts at evasion amply contradict. In people of this temperament some element in the mind remains alert to warn that evil sentiments, even if acceptable, are wrong and dangerous. For them, the anonymous letter is at once a safe shield and a perfect instrument for self-deception, by means of which they can maintain the pitiful pretence that this loathsome creature "isn't really me." The loathsome creature is, in various forms, the common property of us all, to accept and discipline and not to let loose on our fellows. In the poison-pen it may through indulgence have acquired mastery, but the responsibility, in her view, remains with the individual.

RESEARCH AT THE ROYAL CANCER HOSPITAL

IN the British Empire alone, Kennaway[1] has pointed out, some 60 journals and annual publications must be examined if one is to be reasonably sure of not missing anything valuable having direct reference to cancer research. In three reports on chemical compounds as carcinogenic agents he and J. W. Cook made reference to 871 papers in 114 journals. This scattering of original work provides one good reason for the issue in volume form of the contributions from individual research institutes. Earlier this year the first volume of selected papers of the Royal Cancer Hospital and Chester Beatty Research Institute[2] appeared. A second volume containing papers published originally in 12 different journals is now available.[3] These deal with a wide variety of clinical, radiological and experimental subjects, almost all of them highly technical or specialised. The titles of two stand out as of interest and comprehensible to the general reader. In a paper on trauma and cancer, C. A. Joll discusses the discrepancy between teaching and experience in this still controversial subject. More recent work by MacKenzie and Peyton Rous[4] shows that trauma acts only in combination with specific carcinogenic chemicals in stimulating tumour development. A second report by Cook and Kennaway on chemicals of this nature is included in the present volume. In an examination of human tissue for carcinogenic factors, I. Hieger proceeds to the next logical step—a search in the human body for naturally occurring substances having carcinogenic potency. By special methods of extraction of livers from both normal and diseased subjects, and injection of these extracts into mice, sarcomas have been produced, but as Hieger says there is obviously no simple relation between cancer in a human subject and a cancer-producing factor in the liver. Taken as a whole these papers drive home the fact that the greatest gap in our knowledge of cancer is not, as some think, between total ignorance and complete knowledge but between our methods and nature's of causing the disease.

Dr. L. J. WITTS, Nuffield professor of clinical medicine in the University of Oxford, and Mr. J. R. LEARMONTH, professor of surgery in the University of Edinburgh, have been appointed members of the Medical Research Council. These appointments follow on the Privy Council's amendment of the charter of the council, simplifying the rules governing the retirement of members of the council and increasing their numbers by one.

1. Kennaway, E. L. *Cancer Res.* 1941, 1, 164.
2. See *Lancet*, 1943, i, 310.
3. Selected Papers from the Royal Cancer Hospital (Free) and the Chester Beatty Research Institute, London, vol. II, 1939–40. Pp. 376. 16s.
4. MacKenzie, I, and Rous, P. *J. exp. Med.* 1941, 73, 391.

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Special Articles

GENERAL MEDICAL COUNCIL

WINTER SESSION, NOV. 23–25, 1943

THE following names were restored to the Medical Register after penal erasure: Christopher Bastible, Dominic Francis Curran, Richard Christopher Howard, Arthur John Ireland, Charles Liddell McHarg, Antony Alexander Martin and George Anderson Mitchell. The names of John Donaldson and Edwin Spencer Tebbutt were restored to the Dentists Register.

Charges against Practitioners

The council, after considering reports from the Dental Board, directed the registrar to erase the following names from the Dentists Register: *Cyril Walter Bairstow*, registered as of 13, Hoe Street, Walthamstow, London, E.17, Dentists Act, 1921; and *Thomas Gordon*, registered as of 60, Otago Street, Hillhead, Glasgow, Dentists Act, 1921. Mr. Bairstow had been found guilty by the Dental Board of wrongfully obtaining money by untrue dental letters; and Mr. Gordon had been convicted of theft at Clerkenwell police-court.

PROFESSIONAL RELATIONSHIP NOT PROVED

The case of *Joshua Posner*, registered as of 261, Hyde Park Road, Leeds, LRCPI (1919), summoned on the charge of committing adultery with Phyllis McNulty, a married woman, with whom and/or her husband he had stood at all material times in professional relationship, and of thus being guilty of infamous conduct in a professional respect. Dr. Posner appeared, accompanied by Mr. Oswald Hempson, solicitor, who admitted the adultery but put the professional relationship in issue.

Mr. Winterbotham, the council's solicitor, prosecuting, read from the transcript of the evidence of Mr. B. G. McNulty, the husband, given before the Divorce Court. This showed that the couple had been married in 1933 and had been happy until the beginning of the war. Mrs. McNulty had been a beauty specialist representing a London firm in Leeds, and making more money than he made. In 1938 he had taken out an endowment policy and Dr. Posner had examined him on behalf of the insurance company. Later, the doctor had treated him for a football injury, and had become a friend of the family. He was sure that Dr. Posner had attended his wife professionally. When he was home on short leave in October, 1939, his wife had been complaining of illness and anæmia and the doctor had said it was quite possible that she would need an operation, and asked him for authority to have the operation performed. It had been performed, and he had been told of it two days afterwards. The doctor had seen her in the nursing-home as her medical adviser.

A statutory declaration by the secretary of the nursing-home was put in, deposing that the wife had been admitted for operation on Nov. 3, 1939, under Mr. B. L. Jeaffreson, the gynæcologist, coupled with the name of Dr. Posner. She had assumed that Dr. Posner was the general practitioner referring the case. The nursing-home register showed his name in that capacity.

Dr. Posner, giving evidence, said he was a temporary flight-lieutenant in the RAF. He was married, but had not cohabited with his wife for well over 15 years, and she was now in America with their children. He had first met Mrs. McNulty about Christmas, 1934, and had known her as Miss Cutler. He had not discovered until 1937 that she was married, and before that time they had become close friends and then lovers. He had first come in contact with her husband when in 1938 he had examined him for life insurance without realising his identity. He had only known him for her husband when, at the end of 1938, he had been sent for by telephone to Mrs. McNulty's flat to treat him for a football injury. He had gone unwillingly and strapped the knee, had seen him twice afterwards, and had made no charge. Since then he had discovered the relations that existed between Mrs. McNulty and her husband. He never saw her in her house alone but studiously avoided doing so. Her husband kept on ringing him up and asking him to go out, and he had been out with the couple together, though he had never sought such a friendship. His own wife, who had known of the association with Mrs. McNulty, had always refused to go with them. The first time the husband had raised any question about the association between his wife and the doctor had been on an occasion in 1939 when he had seen them embrace in the hall. The next day they had discussed the situation and the doctor had told him that they were prepared to marry. The husband did not appear to be angry. The doctor had played no professional part in Mrs. McNulty's operation but had merely engaged the specialist and paid his full fees and those of the nursing-home. He had not been present at the initial consultation, and had visited the wife in the home as an ordinary visitor in visiting hours. He had been present at the operation, but only as a spectator.

Mrs. Phyllis McNulty gave evidence confirming Dr. Posner's. She said she had been married in 1933, had never been happy with her husband, and had left him in 1934, intending that the separation should be permanent. They were entirely unsuited to one another. They had never cohabited since then, but he had occasionally slept in another room at her flat. She had been universally known by her maiden name of Cutler. She had been earning £10 or £12 a week, her husband only a few pounds as a travelling salesman. Dr. Posner had never attended her professionally, and on one occasion during their relationship (apart from the operation), when she had needed a doctor she had called in another. When the damages were agreed at £500 the husband had accepted a condition that no mention should be made during the proceedings of the fact that the correspondent was a doctor. She was very surprised when her husband had broken this condition. He had remarried almost immediately after the decree absolute.

Mrs. Spencer, Mrs. McNulty's mother, also gave evidence; and Mr. Hempson read a statement from Mr. Bryan Leslie Jeaffreson saying that Dr. Posner had made an appointment for him to see Mrs. McNulty but had taken no active part in the arrangements for her treatment, and had refused to give the anæsthetic, saying that he was not in any way her doctor. Mr. Jeaffreson also deposed that he had given all the after-treatment and had never seen Dr. Posner present at the home in any medical capacity.

The council, after short deliberation, announced that professional relationship had not been proved.

IMPROPER CERTIFICATION

The case of *James Brierley*, registered as of 229, Boundary Street, Liverpool, LMSSA (1908), summoned to appear on the following charge:

That you were on May 24, 1943, convicted, after having pleaded guilty, at the Liverpool City Police Court of the following misdemeanours—viz, (1) Of unlawfully issuing a medical certificate to Stanley Kane having reasonable cause to believe that it was likely to mislead officers of the Fire Guard organisation in the discharge of their lawful functions in connexion with the defence of the realm or the securing of public safety (date of offence March 26, 1943), and were fined £15; (2) the like (date of offence April 1, 1943), and were fined £15.

The respondent was not present, but was represented by Mr. Oswald Hempson, solicitor.

Mr. Winterbotham, laying the facts before the council, proved the convictions and read extracts from the evidence given at the trial. When interviewed by the police, the respondent, it was said, had shown signs of incipient senile decay; his clothing had been dirty and he had broken down and wept. In his own reply the respondent said that he had often been asked for certificates but had never issued an untrue certificate and had always avoided exaggeration. He invariably saw the patient at the time or shortly before, and examined at least the eyes, tongue and pulse. His difficulty was the absence of a fixed standard. He used the qualification "I am informed" because he could not trust the veracity of the patient.

Mr. Hempson said Dr. Brierley was an old and sick man. Two proposed charges had been dropped because he had clearly been blameless; those on which he stood convicted had arisen out of action inspired by the police. He had ample private means and lived and practised of his own choice in the slums of Liverpool, where he had devoted the last eighteen years to treating the poor. He had worked throughout the whole of the heavy bombardment, assisting the wounded and homeless. His life had been without blemish. Mr. Hempson put in many testimonials to his outstanding character and services.

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The President announced that the council took a grave view of culpable laxity in certification, which injured the recipient and others, including the state, and also the good repute of the profession. They had decided, in view of the circumstances in which the false certificates were given, to postpone judgment for twelve months, subject to the usual conditions that the offence should not be repeated and certificates of good conduct should be submitted before the adjourned hearing.

ERASURES FOLLOWING CONVICTION

The council directed the erasure of the names of three practitioners who had been convicted at assizes of procuring miscarriage. They were:

Richard Murray Barrow, registered as of Mansion House, Stone, Staffs, MB Durh. (1911), summoned to appear on the following charge:

That you were convicted, upon your own confession, at the Stafford Assizes commencing on June 28, 1943, of the following felony—viz., (1) Of supplying a noxious thing, namely a pill, with intent to procure the miscarriage of Gwendoline Mary Theodore, on July 3, 1942; (2) the like on July 7, 1942; and were sentenced to nine months' imprisonment in the second division in respect of each charge, the sentences to run concurrently.

Alfred William Bevis, registered as of 15, Monks Road, Lincoln, MRCS (1909), summoned to appear on the following charge:

That you were at the Lincoln City Assizes commencing on June 5 1943, convicted, upon your own confession, of the following felony—namely, of unlawfully using an instrument or some other unknown means to procure the miscarriage of a certain woman named Iris Louise Dykes, and were sentenced to three years' penal servitude.

William Goodacre Roberts, registered as of 29A, Islington, Liverpool, MRCS (1921), summoned to appear on the following charge:

That you were convicted at the Manchester Assizes commencing on May 3, 1943, of the following felony—namely, of using an instrument to procure miscarriage, and were sentenced to four years' penal servitude.

The council also directed the erasure of the name of *Humphrey Manley Hamilton Ashwin*, registered as of 21, Wilton Street, London, S.W.1, MRCS (1925), summoned to appear as a result of conviction at the Horncastle petty session, Sept. 20, 1943, of embezzlement of four sums from his employers, and, further, of conviction at a general court-martial in April, 1942, at Cardiff of conduct to the breach of good order and military discipline in ten cases—in five other cases of behaving in a scandalous manner, and of offering fifteen cheques, failing without reasonable excuse either to ensure that he had sufficient funds in the hands of the bank to meet the said cheques when presented, or to make arrangements for the said cheques to be honoured when presented.

The council also considered several charges arising out of convictions for drunkenness, but did not direct any erasures.

ERASURE UNDER SECTION 26

The council, in pursuance of section 26 of the Medical Act, 1858, made an order in writing directing the erasure from the Medical Register of the entry made therein on Feb. 9, 1942, in respect of Mrs. Astrid Hill, MD Oslo (1922), under Defence Regulation 32B and the Medical Register (Temporary Registration) Order (No. 2), 1941. (This section permits erasure of names entered as a result of mistake or false information.)

The Pharmacopœia

The Pharmacopœia Committee reported that the number of copies of the British Pharmacopœia, 1932, sold up to May 19 was 52,933; of the 4000 copies of the sixth Addendum published last August, 3715 copies have already been sold, said Prof. David Campbell, presenting the report; this emphasised the urgent need for a larger supply of paper for this purpose. A seventh Addendum is in preparation, and good progress has been made in the preparation of matter for the next complete Pharmacopœia. In May, 1943, a subcommittee was appointed to confer with the British Pharmacopœia Commission on the position of drugs subject to patent rights. The committee decided to report to the council as follows: "In selecting drugs for inclusion in the British Pharmacopœia, the British Pharmacopœia Commission need not consider its choice restricted by actual or potential patent rights in manufacture."

MEDICINE AND THE LAW

The Goldschmidt Prosecution

MEMBERS of the House of Commons were not slow to question the Home Office representative about the magistrate's condemnation of the police for the use of *agents provocateurs* in the unsuccessful attempt to obtain a conviction against Dr. Goldschmidt for false certification. The official reply claimed that the action was within the permissible limits laid down in 1929 by the Royal Commission on Police Powers and Duties. The commission's report, it was contended, recognised that in certain types of case the police could not enforce the law without adopting the methods used; a distinction was drawn between incitement to commit an offence and "the employment of subterfuges in order to obtain evidence where habitual offences are reasonably suspected and there are no other means available to the police of procuring the necessary evidence." Is there not a risk that this public statement will make things worse instead of better? It implies that the use of the challenged methods is not merely tolerated to help the police out of difficulties inherent in the law (almost as if convictions were more important than fairplay) but also that their use will consciously convey to the tribunal at trial the information (in fragrant defiance of the accepted principles of British justice) that the accused is believed to be a habitual criminal. The official spokesman told the House of Commons that "the police would not countenance the employment of *agents provocateurs*." The police serjeant concerned in the prosecution on Nov. 16 agreed with the magistrate that *agents provocateurs* was a not inappropriate description of the three witnesses whose invented stories and simulated illnesses were meant to trap Dr. Goldschmidt. It is not for us to reconcile these opinions; the magistrate's observations are on record and will be noted in the proper quarter. What we are bound to emphasise is the intense resentment felt that it should be thought necessary, in the words of Dr. Haden Guest's question, "to employ these Gestapo methods against anyone in the medical profession." Did not the authorities know, he asked, that it was possible to find out what a doctor was doing otherwise than by this unfortunate procedure?

The 1929 commission, set up after an incident in Hyde Park, took note of the allegation that the police were occasionally used as *agents provocateurs*, arising probably from the methods they were found to adopt to obtain evidence in certain types of case. "The use of a foreign phrase for which there is no exact English equivalent," said the report, "indicates that the practice is regarded as alien to our habits and traditions: we assume that an *agent provocateur* may be taken to mean a person who entices another to commit an express breach of the law which he would not otherwise have committed, and then proceeds or informs against him in respect of such offence." The commission found two schools of thought, police opinion itself being divided. One school held that the police should limit themselves to observation only and should not participate in the offence. The other held that the police must participate in offences but "should not in any event initiate them." The report commented that neither school countenanced "the practice of initiating offences with a view to enticing or entrapping members of the public into committing breaches of the law." The Royal Commission was prepared to allow the exceptional practice where observation without participation was impossible; it instanced the sending of a police-woman to consult a fortune-teller who was known to be taking money from ignorant girls by prophesying a happy future. It should not be difficult to distinguish a medical man honourably carrying on a lawful profession from a charlatan committing an illegal act. The significant fact about the proceedings against Dr. Goldschmidt was that, even with the police trap and the chorus of pretended invalids, the magistrate was satisfied that no offence had been committed.

Prof. T. P. MCMURRAY will open a discussion on the late problems of war surgery at 2.30 PM on Thursday, Dec. 16, at the Ministry of Pensions Hospital, Woolton Road, Liverpool 16.

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In England Now

A Running Commentary by Peripatetic Correspondents

WE have two patients in the ward. One looks like the Devil, the other like St. Augustine. The devil has diabetes, but St. Augustine has tabes.

A bad thing has happened. We had a criminal in the ward, and he escaped. He was in the hands of the police, and for a long while they guarded him rigorously, unaffected by his worry at having had a hæmatemesis. (He had it in jug; the policeman saw it.) But on the fatal day Sister had already realised that the guard was a weakling. The previous ones had never left his side; they had bladders as big as themselves. This one went so far as to talk to the other patients. Naturally he weakened towards the middle of the afternoon and went into the annexe to see a dog about a tree. The criminal jumped out of bed, dressed, waved goodbye to a cardiac failure and an active tubercle ("So long, boys," he said, "Best of luck.") and that was all that was seen of him. If anybody has a patient wearing a white shirt and grey trousers and passing a melæna stool, will they please ring Whitehall 1212?

* * *

For fifteen years, they say, not a single doctor has sat through a session of the General Medical Council as a spectator. Why should he? I dunno. But there are plenty of empty seats in the public gallery for anyone thinking of conducting his own defence some day. There are, in fact, two galleries, one at either end of the oblong court, a bright airy room, newly white painted since the blitz that damaged the building severely, and decorated with youthful embossed figures; even a cheerful room, with cheerful open fires to keep it cozy in winter, though there is nothing cheerful about the proceedings. The officials of the council—the president, with on his right the legal assessor, and on his left the registrar, chairman of business and treasurer—sit on a raised dais, with their backs to the great windows looking out on Hallam Street below. The floor of the court is divided in two by the solicitors' table, where sit the counsel, solicitor and solicitor's clerk for the respondent on one side and those for the council on the other. The council proper occupy six rows of leather-backed chairs, six or so councillors to a row, facing the solicitors' table, which splits them accurately in two. Each councillor has his desk, complete with bookcase full of tomes of reference and covered with papers. The witnesses have their box at one end of the high table, and the clerks take it all down under the president's eye. Lastly, there is the respondent himself, the cause of all this bother. His little box, with its chair, is squeezed against the wall at the end of the solicitors' table, so that he faces the president across a field of green baize and can mesmerise himself by staring at the glittering mace lying where president or clerk can seize it up if a councillor runs amok. From the public gallery the drowsy spectator sees the court as a suburban back-garden, with a wee oblong lawn in the middle, evenly spaced geraniums all round—the Medical Registers glowing before every councillor—a glistening patch of marigolds where the mace lies on the right, and a tiny speck of blue hyacinth on the left where over the respondent's head hangs a plaque of Hygeia.

* * *

One of the others has skidded on a steep hill and finished up under her cycle with a cut thumb and a grazed shoulder. A country doctor whom I rang up about some antitetanic serum told me, "I don't keep it; I always run into B for some when I want it." But B was the wrong way for us. W, however, was only a few miles off our route, so leaving the others I rode there, picked up from the W General Hospital the 3000 units the HS promised me over the phone, and we re-gathered at that night's stopping place for supper. It was already half-past nine and getting dark when the two of us set out to find the nearest doctor. The landlady had told us he lived at A, which was four miles away—"On the right, just past the market square; Dr. S is his name." It was a fine, starry night and we found his house without much difficulty, Mrs. S (so we learned later) opening the door to us; but having heard my request she said she was awfully sorry but it was Dr. S's half-day and he was not expected back before midnight.

There was an isolation hospital at A, where I thought night-sister would surely give the serum if asked; and Mrs. S directed us. "Go back, and where the road gets very narrow there's a gate on the left. That takes you to the back of the fever hospital. It's before you come out on the main B road. You can't miss it." When we came out on the main B road it was obvious we must try again, and this time, by groping in the hedge with a cycle lamp, we found a small white gate. A steep and cabbagy earth path led us to the back of the fever hospital and we stumbled round to the main entrance. There was a clock ticking in the silence, a dim light and a vague hospital smell; and after we had clattered about a bit there appeared through a door on the right a figure in blue uniform whose changeless expression spoke of years of isolation. She said nothing, so I asked if I might speak to the night-sister. "I am the day-sister," she replied unexpectedly, "and the night-sister too," she added. "My friend fell off her bike," I explained, "and needs some ATS. I fetched some from W this afternoon. We tried Dr. S but he is out. Would you mind giving it?" "But I couldn't give an injection, not without doctor's orders" she said. "Who is the doctor?" I asked. "Dr. S," she replied. "This is a fever hospital, you see; suppose the patient got an infection, there might be a complaint against the hospital." "But your syringes are quite sterile, I'm sure; may I give the injection? I am a doctor." "Oh, but I can't lend hospital property," she answered, "Mrs. S rang up to say you were coming, and as Dr. S happened to ring up to ask if anything had come in I told him and he said on no account must I give the injection." This gave me an idea. "If I might find out on the phone from Mrs. S where Dr. S is I could explain it all to him," I suggested. She felt cornered, evidently, and without a word went through the door on the right. In a few moments she returned. "The matron says she is sorry but we can't do anything for you," she announced. "Might I, perhaps, speak to the matron myself?" I asked. "The matron," she replied severely, "is in bed."

There was still the district nurse, and we found her house a few miles off with the help of a notice in a village shop window, and a man who showed us the way, riding between us as he had no lights. The village was silent; it was 11.15 when we knocked at the door. At last a short figure in curlers and a dressing-gown, holding a lighted candle, drew the bolts and opened the door to us. She listened to my story. "Well, my dear," she said, "doesn't that mean an injection? It might be dangerous, mightn't it?" I explained that it is often done, and is quite harmless. "But I couldn't do it without doctor's orders," she said. I offered to write a prescription. "But I mean our own doctor," she replied, "Dr. S of A." "Well," I suggested, "I'll tell you what; if you will lend me your syringe, I'll give the injection." "But my dear," she gasped, "I haven't got a syringe."

We gave it up. Next morning we passed through H and had the ATS given in the casualty department of the H Memorial Hospital.

* * *

"What is a mouldy cold, Daddy?" The Professor laid down the *Lancet* he was reading and looked at the ten-year-old with interest. "Who called it a mouldy cold?" he asked. "Wel-l-l, cook said this morning that she had a re-el mouldy cold coming." Later that week: "Gentlemen, I assume you have seen the *Lancet* this week. I have no doubt you have read the articles on patulin, a derivative from moulds, and a substance of therapeutic promise in the treatment of colds. The published results indicate that not all the common colds will yield to patulin—they are too motley a crowd for that! But some will, and some won't. Those that are most likely to be cured are the re-el mouldy colds—ahem!—I mean . . ."

* * *

"Of course you know, Doctor," said little Roy's father, "he was a forced conception." I looked at little Roy, from whom we had removed a dermoid of the testis. Social Medicine—ætiology of teratomas—was I on the verge of a new realm in oncology? In spite of the flight of ideas, I hoped my face remained as untroubled by this remark as the dirty, contented sweet-sucking Roy. "How," I asked, "did that come about?" Roy's father exhaled some more beer. "They had to use chloroform, Doctor," he said impressively, "and instruments."

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Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

THE eighth session of the present Parliament, the thirty-seventh of the United Kingdom of Great Britain and Northern Ireland, has come to an end. It began on Nov. 11, 1942, and was prorogued a few days over a year later. The King's speech on the prorogation reviewed the Moscow conference and drew attention to the part played by the Chinese government. The speech says that the U-boat attack is "largely broken," that in the Mediterranean "resounding victories have been won," rejoices in "the increasing successes of the armies of our heroic Russian Allies," and pays tribute to the courage and determination of our merchant seamen. The year's record on the field of battle is inspiring, but the King's speech at the opening of the new session, while affirming that the prosecution of the war will be the first task of the coming year, also outlines big plans for the future. In the next few months we are promised provisional plans for the period of transition from war to peace. Some of them, those of UNRRA for food and relief work in Europe, are already far advanced. But the end of the war in Europe will, probably, leave us still at war against Japan. Thus we face a future in which the perspective of war changes but in which war is still the master of the world, harnessing men's energies in its service. But the King's speech looks beyond "the transitional period." There is to be an education act on the lines of the white-paper. There is to be provision for the training and employment of disabled persons, and the law governing the reinstatement of men and women discharged from the Services is to be amended. Legislation is to be passed giving powers for the redevelopment of areas which, because of bombing, overcrowding "or otherwise," need replanning.

The speech has not been too well received. It is stated in one paragraph that the primary aim of the Government is to provide "food, homes and employment." But the administrative plans on the legislation required to give them effect are not indicated. The question is asked how the distressed areas which existed before the war will be dealt with. What will happen in a mining area where mines have been permanently closed and whose population is now employed on manufacturing munitions of war? No generalisations will suffice. Looking a little further ahead, how are the fifth of the electorate, including the young men and women of the Services, who have never had the opportunity of voting, to be given the chance of shaping the land to their desire? Commander R. A. Brabner of the Fleet Air Arm, who moved the address in reply to the King's speech, put this clearly. "If young men make war, I hope they are entitled to some attention in the peace," a point with which the very large number of young medical men and women serving in the forces would probably agree. Mr. George Griffiths, the miner MP, seconded the address, and Colonel Elliot dubbed the new session "a dual-purpose session" because it had to mix the facts of war with the thoughts of peace.

The Prime Minister has warned the country that the war prospect ahead may be one of severe trial and great casualties. There may be political casualties too. On the last day of the old session a storm blew up over the release from detention, subject to special restrictions, of Sir Oswald and Lady Mosley. Sir Oswald is released on medical grounds—viz., "thrombophlebitis." It was pointed out in a question that the medical, nursing and hospital facilities available at Holloway Prison were good and that Sir Oswald and his wife were living in a four-roomed flat. Why then, release? Other Fascist detainees are being released on other grounds. Is there no longer danger from these people in the Home Secretary's opinion? A storm of anger swept over the country, and there have been protests from Australia and Canada. Because of this a debate has been arranged in which MPs will have the opportunity of criticism and the Minister an opportunity of justification. Some MPs who have always disliked the powers for detention conferred on the Home Secretary by regulation 18B are putting down a motion asking for the release of all internees. So the debate will be lively.

QUESTION TIME

Medical Reasons for Mosley's Release

Dr. HADEN GUEST asked the Home Secretary why, as the medical and nursing services provided in Holloway prison were adequate for prisoners there confined, supplemented where necessary by arrangements for operation or other treatment in London hospitals, it was necessary, for medical reasons, to remove Sir Oswald Mosley and Lady Mosley from detention in that establishment.

Mr. H. MORRISON, in the course of a statement on the reasons for Sir Oswald Mosley's release, said: From time to time representations have been made to me as to the state of his health, and it accordingly became the duty of the prison medical authorities to advise me as to the nature and degree of the risk to his health which his continued detention would involve. For this purpose it was arranged that there should be consultation between the prison medical authorities and Lord Dawson of Penn and Dr. Geoffrey Evans. A consultation accordingly took place between the medical commissioner of prisons, two prison doctors and those two medical practitioners. The opinion of these five doctors was unanimous: it was that if the patient remained under the conditions which are inseparable from detention there would be substantial risk of the thrombophlebitis from which he is suffering extending, and thus producing permanent damage to health and even danger to life. This complaint is of long standing, and the question was not whether the appropriate medical treatment could be given in a prison establishment, but whether there was a reasonable chance of checking serious deterioration of his health unless the patient were allowed a greater measure of freedom for outdoor exercise and varied occupations than is possible in a place of detention. The opinion of all these medical men was that, if the matter were considered purely on medical grounds, release from detention was essential for the purpose of checking the extension of his complaint and providing any reasonable prospect of recovery. On receipt of this authoritative medical advice there were only two courses open to me. First, I had to consider whether I ought to take the responsibility of detaining this suspect to the permanent damage of his health and possibly to the danger of his life. On this point I can only say that, while considerations of national security must come first, I am not prepared, subject to this overriding consideration, to let anyone die in detention unnecessarily. This policy is based not on the inexpediency of making martyrs of persons who do not deserve the honour, but on the general principle that those extraordinary powers of detention without trial must not be used except insofar as they are essential for national security. . . . While it is right that account should be taken of medical considerations, especially when, as in the present case, there is a risk of permanent injury to health or danger to life, such considerations cannot be paramount. They must be subordinate to considerations of national security. My justification for taking on medical grounds a course which would not otherwise have been taken, even at this stage of the war, is that I was satisfied that no undue risk to national security would be incurred by the release of this man, subject to stringent conditions, in the circumstances obtaining at the present day. . . .

I have authorised the release of Sir Oswald Mosley in the belief that in present circumstances adequate control can be maintained over him by the restrictions which I have imposed. But let there be no misunderstanding. If for any reason, whether because of evasion of any restrictions imposed on him or because of any change in the situation, it became necessary, on grounds of public security, to bring him back to detention, medical considerations would not be an obstacle to the course dictated by the national interests.

Commander O. S. LOCKER-LAMPSON: Will the Minister allow five doctors from this House to examine Sir Oswald Mosley?—But Mr. MORRISON declined to answer the question.

Sir ALFRED BEIT: Is it not a fact that phlebitis in its various forms needs absolute quiet and rest; and how can it be said that a person suffering from illness must have greater freedom of movement and opportunities for exercise? Mr. MORRISON: I am not a doctor, but I understood that it requires both things—rest and also vigorous exercise. But it is not for me to pronounce a medical opinion; it was for me either to accept this formidable body of medical opinion, or to take the responsibility of saying that these medical men were not telling the truth, or were not competent. I did not feel that I could do that.

Replying to Mr. SHINWELL, Mr. ATTLEE said that if there was a general desire in the House for a debate on this matter time could be provided.

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Alleged Gestapo Methods against a Doctor

Sir HERBERT WILLIAMS asked the Home Secretary what steps he proposed to take to prevent the police acting in future as agents-provocateurs, as they did in the case against Dr. Goldschmidt, which was heard at the North London Police-court on Nov. 16.—Mr. O. PEAKE replied: The limits within which the police are justified in giving opportunities to a person to commit an offence in order to obtain evidence against him are set out in the report of the Royal Commission on Police Powers and Duties, which recognised that there are certain types of case in which it would be impossible for the police to carry out their duty of enforcing the law without the adoption of such methods. The police are, however, well aware that the courts will always scrutinise most narrowly the evidence of any witness who can be represented as having encouraged or procured an offence which would not otherwise have been committed, and no action on the part of the Home Secretary is required to remind the police of the great care which must be taken in cases of this kind. I am not aware of anything in the case which need cause anxiety to a doctor who accepts in good faith a statement made to him by one of his patients.—Sir H. WILLIAMS: In this case were not three men encouraged by the police to go to a doctor and make a statement which they and the police knew to be false? Is not this a most undesirable procedure?—Mr. PEAKE: I think that there is a clear distinction which is well understood by the police between incitement to commit an offence which is wholly wrong and which is a disciplinary offence and the employment of subterfuges in order to obtain evidence where habitual offences are reasonably suspected and there are no other means available to the police of procuring the necessary evidence.—Sir H. WILLIAMS: Does the Minister think that the action of the police in this case was justified?—Mr. PEAKE: We have noted the view of the learned magistrate, and any necessary action will be taken.

Dr. HADEN GUEST: Does the Minister really think it is necessary to employ these offensive Gestapo methods against anyone in the medical profession? Does he not know that it is intensely resented that this should be done and that it is possible to find out what a doctor is doing otherwise than by this procedure?—Sir ARCHIBALD SOUTHBY: Has the Minister's attention been called to the remarks of the learned magistrate who tried the case, and does he not think it most unfair to the police themselves that they should have to take this kind of action?—Mr. PEAKE repeated that note had been taken of the remarks of the magistrate and any necessary action would be taken, and replying to a further question said the police would not countenance the employment of agents-provocateurs. This was not a case where there had been incitement to commit an offence.

Responsibility for Postwar Housing

The primary responsibility will continue to rest with the Minister of Health and the Secretary of State for Scotland, the Ministry of Works giving to these departments technical advice on design, methods of construction and building materials. The proposals for a postwar housing programme must, of course, be coördinated with the rest of the Government's plans for reconstruction in the years immediately following the end of the war, and this will be one of the duties of the Minister of Reconstruction. (Mr. C. ATTLEE replying to Sir IRVING ALBERY.)

Pregnant Women in War Industry

Inquiries have been instituted by the Government through a number of sources to ascertain the extent to which women engaged in industry do in fact remain at work to a late stage in pregnancy or return to work too soon after childbirth. It is anticipated that these inquiries will be completed in time to enable a full statement to be made as to the information obtained and the Government's decision early in the new year. (Mr. ATTLEE replying to Mr. W. BROWN.)

Milk for Expectant Mothers

In answer to a question Mr. W. MABANE stated: The position of expectant mothers residing in premises licensed as catering establishments has recently been re-examined and it is hoped shortly to introduce arrangements to enable eligible beneficiaries living in such establishments to obtain the financial benefits of the National Milk Scheme.

Increased Number of Old People

Replying to a question Mr. H. U. WILLINK, Minister of Health, said: The increases in the number of men over 65 were, during each of the past two years, estimated at about 50,000 and 60,000 respectively. These figures represent an average percentage increase of about 30% per annum. Comparable figures for women over 60 were about 93,000 and 102,000 and 2·9% respectively.

Medical Conditions of Repatriated Prisoners

Mr. RHYS DAVIES asked the Secretary of State for War whether all the men recently repatriated from German prisoner of war camps were to be allowed their discharge from HM forces.—Sir JAMES GRIGG replied: It is likely that most of those repatriated, after examination by a mixed medical commission, will be discharged from the Army. Those who are found to be fit for further military service of the kind permitted by the Geneva Convention will be retained.—Mr. DAVIES: Are we to understand that these men, who have suffered so much, will not be entitled to their discharge if the War Office decides to retain them?—Sir J. GRIGG: If their medical condition justifies it, they will be discharged, and most of them will be. Those who are fit will be retained for such service as the Geneva Convention permits.—Mr. DAVIES: Were they not repatriated because they were wounded, and too sick to be in the Army?—Sir J. GRIGG: Some have improved in condition after being repatriated; but the majority will be discharged.

Medical Policy Association

Dr. H. B. MORGAN asked the Home Secretary whether his attention had been called to the anti-semitic propaganda carried on by the Medical Policy Association, London; and whether, in view of their effect on the war effort of this country, he had considered the desirability of a prosecution.—Mr. MORRISON replied: I have seen the first bulletin issued by this association. This document appears to introduce, quite gratuitously, certain arguments which may be regarded as having an anti-semitic bias, but it affords no ground for prosecution, or for any other action on my part.

Dr. MORGAN asked the Postmaster-General whether he was aware that Dr. Basil Steele, of Regent's Park, employed by the Post Office on medical duties, was the secretary of an anti-semitic organisation known as the Medical Policy Association; that Dr. Russell V. Steele, practising at the same address, was a local post-office medical officer, whose duties involved attendance on a capitation agreement to postal employees in his district; and whether, in view of the anti-semitic views of these two doctors, he would consider allowing Jewish post-office employees to make alternative medical arrangements.—Captain H. F. C. CROOKSHANK replied: Dr. Basil Steele is not employed by the Post Office, but assists his brother, Dr. Russell V. Steele, a general practitioner who has been a local post-office medical officer for nearly twenty years. I have no reason to think that Dr. Russell V. Steele allows whatever political views he may hold to interfere with the proper discharge of his professional duties, and I am not prepared to limit his post-office duties in the manner suggested.

HOSPITAL OFFICERS FOR THE SERVICES

THE Medical Personnel (Priority) Committee has told the Minister of Health that unless special measures are taken the number of doctors entering the Forces will fall substantially short of the total required for the year. The need of the Forces is immediate and recruitment must be speeded up. The committee's view, in which the Minister concurs, is that the method likely to operate with least detriment to the civil population is to make a special call on men holding A and B2 posts in hospitals other than mental hospitals. Accordingly all men liable for military service who on Dec. 1 have completed three months in such posts will be called up immediately. No hospital may raise objection unless more than half the holders of its A and B2 posts (including women and alien practitioners) receive calling-up notices, in which case it should immediately send the Central Medical War Committee the names of those who should *not* be recruited in order that half may remain. The practitioners summoned retain their right of appeal on grounds of hardship or conscience.

The late Dr. W. L. Pryce Bevan, of Alton, Hants, left the residue of his estate, which will probably amount to £22,000, to the University of Edinburgh.

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Letters to the Editor

AGENTS PROVOCATEURS

SIR,—The case briefly recorded in your last issue must be of interest to every medical man in the country. The evidence disclosed that three agents-provocateurs consulted a medical practitioner at the instigation of New Scotland Yard, and after giving a false name in one case, and false addresses and false medical histories in all cases, obtained certificates that they were unfit for work. The three men were subsequently examined by the police surgeon, and found to be fit for work. The practitioner was arrested and proceedings brought against him under the Defence Regulations. It was admitted in court by a police witness from the Criminal Investigation Department that he had instructed the three police agents to give the false information, and to feign sickness, and that he had also told them what to say. Finally, all these facts were admitted by the legal representative of the Director of Public Prosecutions. The charges against the doctor were dismissed, and costs of ten guineas awarded against the prosecution.

The *Times* of Nov. 17 summarised the magistrate's comments as follows :—

"The police officer himself has agreed that the three men who went to the doctor were agents provocateurs. Not only ought such methods not to be encouraged, but let me say for my own part that I hope no such cases, where such methods are employed, will be brought into this Court. The facts in this case, he said, are that these three men went to the doctor, at different times. They themselves said they were told what to say by the police officer. They had each of them admitted that the stories they put up to the doctor were wholly untrue. That kind of thing was wrong. The very basis of the relations between doctor and patient was honesty. In his view, the doctor had reasonable cause to believe that these three certificates which he gave could be given in good faith, because of the stories which were told to him by the men."

The importance and implications of this case should not be lost sight of by the profession, and it is to be hoped that the strongest possible protest will be sent by the various professional bodies to the Home Secretary and also to the Minister of Health. At the same time the thanks of the profession are due to the magistrate for his condemnation of the disreputable police methods and to the press for the publicity given to the proceedings.

Mutual confidence is the only possible basis between a doctor and his patient. The patient's history of his symptoms is so essential for accurate diagnosis that except in gross or advanced disease, or in the case of known malingerers, the doctor is bound to accept it as part of his medical evidence. The difficulties in connexion with medical certification are great, and the doctor usually grants a certificate only after a consideration of the patient's symptoms, the physical manifestations of disease, and a consideration of the patient's temperament and work. And even with the best will in the world there will on occasions be differences of opinion as to whether a patient is, or is not, fit for work. But what is the hard-pressed doctor to do when confronted with a patient who may after all be a police decoy acting under instruction, and whose story is a tissue of lies from beginning to end? The simulation of symptoms may be easy and the simulation of signs may not be difficult to those who have been carefully coached. And so the unwary doctor acting in good faith may become the victim of a police conspiracy.

The activities of agents-provocateurs are better known on the Continent than they are here. But even in this country these agents have been employed both by the Government and by the police for a hundred years or more, and under war conditions the number of agents-provocateurs has increased with the increase in indictable offences. The use of these paid spies is condemned by all but a minority of citizens, and the Englishman still prefers to commit his crime without the assistance of police or other agents. The use of agents-provocateurs fills most people with repulsion and loathing, it flouts our conception of law and justice, it discredits the executive and the police, and it sows distrust in the community.

The obvious implications of the employment of agents-provocateurs will be plain to every medical man, but there are two aspects which may less easily be recognised. Firstly, the present trend of medical legislation in this country is its concentration on industrial health rather than on health—a concern for the health of the worker rather than for the health of the citizen. Correspondingly the doctor is becoming more and more an appendage of the industrial machine, and more and more concerned with the patient's capacity to work. We may give grants to early cases of pulmonary tubercle in order to expedite the patient's return to work, or we may give extra food or perhaps in the future compulsory vitamins, in a concern for increased production. These measures may be necessary under war conditions; but the doctor's job, even in a nation of shopkeepers, is to keep or get the citizen well and not merely to keep him at the bench or lathe.

The second implication is far more sinister. If lying agents-provocateurs are to be employed by ministries or by the police to trap the unwary doctor in giving "certifications, notifications, reports or documents of a similar nature," how does the doctor stand in relation to the disciplinary activities of the General Medical Council? The disciplinary work of the Council is already suspect by many members of the profession, the public, the law and the press. Before the GMC there is no subpœna of witnesses and no evidence on oath, and the doctor who has been convicted on the evidence of agents-provocateurs may find himself in a hopeless position and without the safeguards of legal proceedings or any real right of appeal. In the future the position will be as follows. Somebody suspects the doctor of something and informs the Minister of Labour or some other Minister; the Minister informs Scotland Yard; Scotland Yard informs its decoys; the decoys secure a conviction despite their lies; and then the GMC (a branch of the Privy Council) find the doctor guilty of infamous conduct in a professional respect and order the erasure of his name from the Medical Register. But perhaps by that time offences and erasures will have become so frequent that in order to conserve medical man-power the GMC will have power to instruct the Ministry of Health to stop the doctor's quarterly cheque in lieu of erasure!

The attempt to secure a verdict in the present case by the use of discreditable methods is of importance both to the public and to the medical profession. In the brave old world of the future not all the health centres in the country will be of much avail if the confidence between the doctor and his patient is to be destroyed by the stupid and clumsy methods of officials. What would have been the meaning of a verdict of guilty in a case such as the present one in the face of such mendacious activities of the prosecution? What are we to think of the intelligence and ability of the government and police officials who were responsible for advising and concocting such a prosecution? It will be a bad day when the first duty of a doctor, when asked for a medical certificate, is to satisfy himself that he is not dealing with a copper's nark. Finally, it is an ironical commentary on the situation that the doctor who was involved in the present case comes from a country where an arbitrary government acts through the secret police and the agent-provocateur—a country with which we are at present at war.

Harley Street, W.1. REGINALD T. PAYNE.

HEALTH CENTRES AND REHABILITATION

SIR,—The interesting article on the physiological anatomy of health centres in the *Lancet* of Nov. 13 (p. 612), and the description of the attractive plan prepared by Mr. Lionel Pearson, show that careful study is already being given in some quarters to this very necessary example of postwar planning. It is all the more important, therefore, to draw attention to one serious omission in the plan submitted—the absence of adequate facilities for rehabilitation.

Apart altogether from the provision which will be made in future at hospitals, many of which are already commencing to organise proper rehabilitation departments, there will always be a large number of patients who do not attend hospital but who require active rehabilitation after illness or injury. They will include patients recovering from illnesses for which they have

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received treatment at home; others, who have attended at the health centre for purposes of investigation and ambulatory treatment; others again, who are referred to the centre because of industrial fatigue or other signs of sub-health. All these will need active rehabilitation before they are fit to resume full employment, and it is obvious that such treatment should be available on the spot, so that advantage can be taken of the other services —waiting-rooms, canteen, record-taking, &c.—there provided. Every health centre should therefore include a commodious gymnasium, for indoor exercises and remedial games; a suitably prepared ground for outdoor exercises, &c.; and accommodation for remedial handicrafts and other useful forms of occupational therapy.

There is an additional reason for the incorporation of a rehabilitation department in every health centre. The essential element in true rehabilitation is its emphasis on fitness, and the resolving of all difficulties, whether physical, psychological or economic, which prejudice a patient's return to full activity and usefulness. This requires the presence of skilled workers, trained in the handling of psychological problems, well informed on the causes of industrial breakdown and the physical and mental strains associated with particular industrial processes, closely associated with industrial welfare organisations and employment exchanges, and in close touch with residential rehabilitation centres to which the more serious cases should be transferred. The health centre is the natural and proper laboratory for these medico-social workers, and their presence at such a centre would not only complete the work of rehabilitation but would form the necessary link between curative therapy and complete restoration to active and useful life in the community.

Ealing, W.5. HAROLD BALME.

FOOT-DROP AND PRESSURE SORES

SIR,—A patient who has been in hospital for hæmatemesis has come out with bilateral foot-drop and a slough on one heel. A number of patients from various institutions, particularly infirmaries, seem to come out with foot-drop. All too often, on inquiry, it has been elicited that their toes have felt pressed down by carefully tidied tight blanketing, done with extreme hospital thoroughness to ensure that the bed shall look spick and span. It is high time that this state of affairs was terminated. Furthermore, every very ill patient ought to be cradled at once as loss of muscular tone alone may be enough to cause the foot-drop, without tight bedclothes. It is highly probable that tone is much less during rest and sleep and this may be an additional factor.

With regard to pressure sores on the heel, not only are these very painful and likely to make the patient's life a misery, but they can prolong disability considerably, for they often take months to heal. A posterior plaster slab extending half an inch beyond the toe tips and some distance up the leg, ensuring that the foot is at right angles, will not only add to the patient's comfort and prevent this condition but may save the necessity of cradling and avoid foot-drop. Great care should be exercised by nursing staffs to ensure that bedclothes are quite loose over the feet, so that they can be moved about with perfect freedom; this applies especially to elderly patients, who are unable to move round as much as young ones. The excuse that the patient will not get up again has actually been made on one occasion in a municipal hospital. This needs no further comment except that it is on a par with not troubling to ensure that the dying shall pass with clean, moist mouths, without bedsores, and without their agonising dyspnœa—often due to acute pulmonary œdema not eased with morphine.

Hove. J. HARTSILVER.

INTRA-ARTERIAL PENTOTHAL

SIR,—In my letter in your issue of July 10 I suggested that Lees's supposed case of idiosyncrasy to 'Pentothal' was in fact one of intra-arterial injection. This view was also taken by Clausen, as well as by Macintosh and Heyworth in their article drawing attention to the disastrous results that can follow this accident in technique. I know of another case resulting in eventual amputation, but I have not access to the details. I do not believe that, in these days of increasing pentothal administration and war-time non-specialist anæsthetists, the risk of arterial puncture is so remote, but happily we can guard against such catastrophic results. Both of the cases reported by Macintosh and Heyworth were given 10% pentothal. In my opinion this practice is unwise, and is indeed not recommended by the manufacturers. In my personal series the only cases of *intravenous* thrombosis, except one in an old lady aged over 80, have been with solutions stronger than 5%. Also the practice of rapid injection carries a twofold danger, should the drug be intra-arterial—first, by not allowing dilution with circulating blood the concentration of pentothal is kept high; secondly, more irritant drug is introduced into the artery before the anæsthetist is warned by the patient's complaint of the burning sensation. Macintosh advises observation of the colour of the aspirated blood. This is rendered much easier if a straight varicose-vein mount is used between the needle and syringe.

Wimpole Street, W.1. F. W. ROBERTS.

OXFORD VAPORISER

SIR,—With the exception of the original articles by Macintosh and Mendelssohn and two letters in your correspondence columns, Captain M. Rushton's article of Oct. 23 is the first record of a user's experience with the Oxford vaporiser and I find it somewhat disappointing. One is left with the impression that, although the apparatus *does* work and that indeed it possesses certain advantages, Rushton is somewhat surprised that this is the case and looks on the vaporiser as something in the nature of a compromise to be used when other agents are not available.

Ether has been the most useful and most widely used drug for many years, and in the vaporiser one has at last an apparatus with which to administer it in a scientific manner. I maintain that, if properly administered, ether has only two disadvantages—it is difficult to administer (the Oxford vaporiser greatly reduces this difficulty), and the recovery period is longer than with some others. My figures do not show that the post-operative vomiting rate is higher with ether than with other drugs or combinations of drugs inhaled if one excludes a "short gas."

To take up various points in Rushton's article, giving the preanæsthetic two hours beforehand would ensure an easier induction, since the greater time involved obviates the undue depression of respiration which so often results if the premedication is given only an hour beforehand. Also the patient gets the full benefit of its sedative effect. I agree that induction is slower with ether only, but if given skilfully very few patients complain of any unpleasantness. This slowness is chiefly a factor of the time taken to reach surgical anæsthesia. A state of analgesia is attained quite rapidly and once this is achieved the patient is not concerned with what happens later. I have frequently given an ether analgesia with the Oxford vaporiser with nothing but gratitude from the patient.

The administration of chloroform and ether mixtures is unnecessary; they subject the patient to an avoidable risk and may reasonably be supposed to increase the postoperative vomiting. Induction after 'Pentothal' is usually quite easy with no addition to the ether/air mixtures delivered by the apparatus; in difficult cases ethyl chloride or vinyl ether can be given in the induction bag attachable to and supplied with the vaporiser. I have not found that ethyl chloride given in this way increases the liability to vomit to any noticeable extent.

I do not know why Rushton has found it necessary to deliver a flow of oxygen as a routine. In a large series of cases of all kinds I have rarely found this necessary. I do not understand his statement that one of the vaporiser's advantages over simpler apparatus is that the expiratory valve eliminates re-breathing, abolishes dead-space, &c. Admittedly there is no re-breathing with the Oxford apparatus (if the induction bag is out of circuit) but in most other types of apparatus the degree of re-breathing (if any) is controllable by the anæsthetist. I do not consider his statement that settings between 5% and 10% ether can be *often* maintained for long periods is, as he seems to suggest, in any way remarkable. In my experience these settings are suitable for most operations where abdominal relaxation is required.

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Finally, some 18 months' experience with Oxford vaporisers used with ether or trichlorethylene has convinced me that this is one of the most generally useful pieces of apparatus yet devised, that it completely fills the needs of a mobile hospital, &c., and indeed is capable of meeting practically all the calls of a large general hospital.

From an RAF Hospital. R. L. SOPER.

IRRADIATION THERAPY OF NÆVI

SIR,—In his article on the therapeutic uses of thorium-X in your issue of Sept. 18, Dr. Corsi says with regard to nævus flammeus that "since no other satisfactory treatment is known, it is particularly fortunate that thorium-X therapy is available for treatment of at least the milder types of these nævi." I would like to draw attention to an article in the *Archives of Dermatology and Syphilology* for March, 1941 (p. 470) where Dr. Frederick Kalz states that, "Grenz ray therapy is the only method with which satisfactory cosmetic results can be achieved, since beta rays of radium cannot be used in large areas. In the deep type, a decrease in the redness, but not complete involution, can be achieved. The best results are obtained in infants and the percentage of cures successively decreases with age." Since 1936, grenz-ray treatments have been carried out by Dr. Leitner at St. Mary's Hospital and he has found the grenz ray effective in treating nearly all skin diseases which respond to X-ray therapy. He has had good results with nævus flammeus cases, he finds that the best results are achieved in young children and agrees with Kalz that it gives the best cosmetic results; carbon dioxide, X ray and radium are all unsatisfactory compared with grenz-ray therapy. The *British Journal of Physical Medicine* for July-August, 1943, published an article by Dr. Leitner on grenz-ray treatment in dermatology, which gives an account of the common and rare skin affections, including nævus flammeus, which respond to grenz rays.

London. NELLIE I. LANCKENAU.

Public Health

A Sample of Tuberculosis in 1942

Dr. Lissant Cox's 29th annual report on the prevention and treatment of tuberculosis in the county of Lancaster is short in form but full of substance. Since 1938 there has been a rise each year in new pulmonary cases notified and the number in 1942 was the highest since 1933. Non-pulmonary cases have risen during the last three years. Nevertheless the pulmonary deaths in 1942 were the lowest on record and the non-pulmonary were stationary. The 88 deaths from tuberculous meningitis in 1942 compared with 97 in the previous year and the 5-year average of 85, with the usual age-distribution. More than 1000 new contacts were overhauled and the number of X-ray examinations in dispensary work reached the colossal figure of 17,250. Of the 4522 pulmonary patients on dispensary registers at the end of the year exactly a quarter had received surgical treatment of some kind. Referring to the new maintenance allowances Dr. Cox tells us that during the 3½ months up to Sept. 30 last 521 applications had been granted, at an average of £1 8*s.* 2½*d.* a week. His council has asked the Ministry for an extension of the scheme. In September there were 105 names on the waiting-list for institutional treatment, the present basis being 96 beds per 100 pulmonary deaths; another 150-bed sanatorium, Dr. Cox says, should suffice to prevent waiting.

Infectious Disease in England and Wales

WEEK ENDED NOV. 20

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 3098; whooping-cough, 1866; diphtheria, 705; paratyphoid, 4; typhoid, 8; measles (excluding rubella), 556; pneumonia (primary or influenzal), 978 (last week 785); puerperal pyrexia, 134; cerebrospinal fever, 51; poliomyelitis, 8; polio-encephalitis, 0; encephalitis lethargica, 2; dysentery, 176; ophthalmia neonatorum, 74. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Nov. 17 was 1946. During the

Continued at foot of opposite column

Obituary

FREDERICK CRAVEN MOORE

MD, MSC MANC, FRCP

Craven Moore was a Manchester man. He entered Owens College for a science course and took the BSc with first-class honours in biology in 1891, graduating in medicine—also with honours—four years later. After a house-surgeoncy at the Royal Infirmary his interest passed for a time from clinical medicine to pathology and he lectured in Delépine's department. But in 1901 he returned to clinical work as assistant to Dreschfeld whom he helped with investigations into gastric ulcer and enteric fever. In 1904 Moore was appointed physician to Ancoats Hospital and began with his house-physicians the series of investigations into the digestive functions and their disturbances by which he is best known. L. K., one of these collaborators, writes:

"It became an accepted fact that applicants for the post of house-physician at Ancoats were prompted by the desire to obtain Craven Moore's counsel as to subjects for an MD thesis. He was fertile in suggestions and theses written under his inspiration and guidance were usually successful. At least two of these—the rôle of fats in the treatment of disorders of the stomach (1909), and the use of belladonna in dyspepsia (1910)—were read as joint papers to the Royal Society of Medicine. Moore was a good friend to his residents and visits to his house to talk over affairs were almost weekly occurrences. He had a wine cellar of port, which he often produced for the education of our youthful palates, though his own favourite beverage was tea. When Moore gave up his post at Ancoats in 1911 his old residents entertained him to dinner and presented him with a piece of autographed plate."

At that time Ancoats had no recognised place as a teaching unit in the medical school, but a few keen students availed themselves of Craven Moore's orderly and lucid teaching, enlivened as it often was by gentle leg-pulling. One such group included Geoffrey Jefferson and Harry Platt. At Moore's suggestion the occasional lectures given by the staff became a weekly series, alternately by physician and surgeon. This was the beginning of regular postgraduate teaching in Manchester and a few years later the system was adopted at the Royal Infirmary.

In 1911 Moore was appointed to the Infirmary staff. During his earlier years in consulting practice he was assiduous in his hospital work and rarely took more than a few days holiday, usually spent quietly at Port Erin where the biological station attracted him. During the last war he served as a captain on the à-la-suite staff of the 2nd Western General Hospital, combining this with civil hospital work and a growing consulting practice. On Murray's retirement Moore was appointed university professor of the principles and practice of medicine.

Of his human qualities a hospital colleague writes: Moore's temperament might perhaps best be described as urbane. In his earlier days he never spared himself and devoted all his energies to his profession; later, when success was assured, he took things more easily. He retired from his chair rather before he had reached the age-limit and gave up his practice to live in a beautiful place among the hills of Sussex. During his fifteen years of leisure his interests centred upon his garden and his greenhouse. One of his most brilliant lectures was delivered to an audience of students on orchid-

Continued from previous column

previous week the following cases were admitted: scarlet fever, 202; diphtheria, 43; measles, 21; whooping-cough, 59.

Deaths.—In 126 great towns there were no deaths from enteric fevers or measles, 1 (0) from scarlet fever, 11 (2) from whooping-cough, 10 (1) from diphtheria, 39 (1) from diarrhœa and enteritis under two years, and 106 (10) from influenza. The figures in parentheses are those for London itself.

Leeds reported 10 deaths from influenza, Bristol 9 and Bradford 7, no other great town more than 4.

The number of stillbirths notified during the week was 216 (corresponding to a rate of 37 per thousand total births), including 27 in London.

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growing as a hobby for doctors, and his demonstration of symbiosis between seeds and certain species of fungi was masterly. A year or two back he had a partial stroke which aged him, but he made a good recovery and this summer he and his wife—a daughter of the late Sir Edward Holt—were still carrying on their hobby happily. He died at his Sussex home on Nov. 18 in his seventy-second year.

TOM BATES

MB LOND; FRCS

Mr. Tom Bates died at his home in Worcester after a short illness on Nov. 21, at the age of 65. He had been at work until less than a week before his death. His family's association with the Worcester Royal Infirmary goes back over sixty years, for he was the elder son of the late Mr. Tom Bates, who was appointed surgeon to the Infirmary in 1879. He was educated at Worcester Cathedral King's School and at St. Bartholomew's Hospital, where he qualified in 1904. A year later he obtained the fellowship, and after holding appointments as house-surgeon and as clinical assistant to the orthopædic department at Bart's he returned to Worcester. He was appointed an honorary surgeon to the Worcester Infirmary in 1909. During the last war his brother, Mr. Mark Bates, FRCS, also on the Worcester Infirmary staff, and later himself, left for service with the RAMC. Their father returned from retirement to active duties at the infirmary until his death in 1916, when Mr. Tom Bates was recalled. In 1921 he became senior surgeon and chairman of the medical staff committee. He was up to the time of his death chairman of the local medical war committee and group adviser under the EMS for parts of Worcestershire and Herefordshire. He also served on several committees of the Voluntary Hospitals Association.

The Worcester Royal Infirmary was very dear to Tom Bates and was probably the greatest interest of his life. He was looking forward eagerly to the bicentenary of its foundation in 1946 and was proud to claim that the British Medical Association had originated there. His characteristic outspokenness and ready wit might be misunderstood by those who did not know him, but his friends and patients knew him for a kind and generous man, who was always willing to give but who disliked being thanked. In committee or debate he had no use for talking round the point. Although not fond of public speaking he would intervene and in a few brief sentences define the problem, divested of all frills. He made many friends, was an ideal host and was to be seen in his happiest moods at the bridge table.

He leaves a widow, two sons, one of whom is a doctor, and a daughter.

W. P.

JOHN GILMOUR

CMG, MC, MB EDIN, FRCSE

Major Gilmour, formerly president of the International Quarantine Board, Egypt, died in Edinburgh on Nov. 22 at the age of 59. He was an Edinburgh graduate and was seconded to the Egyptian public health department a year after joining the Royal Army Medical Corps in 1909. Recalled to the Army in 1914, he won the MC at the Dardanelles, served in East Africa, France and Palestine, and was a member of the war mission to the United States in 1917. He retired from the RAMC after the war and went to Persia with the League of Nations mission in 1924, and he had already made a reputation for himself as an epidemiologist when he became president of the Quarantine Board in Egypt in 1929. There he led a mixed team of English, French, Dutch, Syrian, Egyptian and other nationals engaged in quarantine control of shipping passing through the Suez Canal and in supervision of the annual pilgrimage to the Hedjaz. Those acquainted with the difficulties of such work appreciated Gilmour's fine qualities and his flair for leadership. He was a first-class organiser and his annual reports on the pilgrimage are models of their kind.

Early in 1926 he was seconded to the Ministry of Health to assist Sir George Buchanan, British delegate to the Office international d'hygiène publique, in revising the International Sanitary Convention of 1912, and he played no small part in the negotiations in Paris that led to the signing of the convention of 1926, which is still the basis of quarantine procedure throughout the world. In 1928 he returned to Egypt, but he was still a regular attendant at meetings of the Paris office, which he much enlivened. Soon after the Quarantine Board was transferred to the Egyptian government in 1938 he came back to this country, where he took up an appointment with the Ministry of Health, being later transferred to the Scottish Board of Health. His health was indifferent, but his wide knowledge, particularly of port administration and the control of shipping, was of great value during a period of stress in Scottish ports. Last year he was appointed a temporary inspector under the Cruelty to Animals Act.

"Wherever he went," says a colleague, "he made friends and won admirers. His breezy manner and his sense of humour made him one of the most popular of men and the most delightful of companions. At the same time, he was severely critical of inefficiency and could be scathing in his condemnation of inefficient or careless work."

"He was a great character," writes another. "Always good-tempered; making light of his many difficulties and problems; tactful, yet extremely persuasive when necessary, he was the ideal man to handle large native populations and to get them to do things which they did not want to do. Those who visited, with him, the quarantine camp at El Tor at the height of the Pilgrimage, will have imprinted on their minds a picture of Gilmour, spruce and cool, despite the great heat, watching and guiding the stream of disembarking pilgrims proceeding to the cleansing and disinfecting station. They will see him quietly intervening in some raging dispute over a missing garment and calming heated tempers by a laugh and a joke in which even the most irate Mussulman had to join.

"A great deal of new work confronts those responsible for the control of epidemic diseases and the prevention of their spread across frontiers by land, sea and air, and the man whose personality, wide experience and wise counsel will most be missed, will be Jock Gilmour."

He was created CMG in 1934 and was a grand officer of the Order of Ismail and the Order of the Nile. He married in 1919; Mrs. Gilmour is left with two young sons.

WILLIAM STEPHENS PITT-PAYNE

MRCS; FLIGHT-LIEUTENANT RAF

Flight-Lieutenant W. S. Pitt-Payne died during October at the age of 37 while on active service overseas. He was educated at Dulwich College and, like his two brothers, studied medicine at Guy's where he qualified LMSSA in 1932. He took the conjoint qualification the same year and after holding a house-appointment at the Royal Hospital, Richmond, joined the family practice at Bromley, Kent, run by his father Dr. William Pitt-Payne, and by his two brothers both of whom are now also on active service. Bill Pitt-Payne was an all round sportsman. He was an enthusiastic member of the OTC at school and won his half-blue at Guy's for cross-country running. Riding was his favourite sport but he played golf, tennis, and rugby, enjoyed a day's shooting and spent several holidays skiing and skating in Switzerland. Though he had no children himself he was very fond of them and all Dr. Bill's young patients were introduced to what he called his "bribery and corruption department"—which consisted of a large bottle of sweets.

W. Dennis Moss, Cirencester

GEORGE HAMER LEIGH

MD MANC, DPH

Dr. G. H. Leigh, a former consultant tuberculosis officer of the Lancashire county council, died on Nov. 12, in Lancaster. He was born in 1876, and qualified at the University of Manchester in 1902, and later took his MD and DPH. After several house-appointments he spent three years in private practice, and before joining the county council as assistant tuberculosis officer in

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1914, he was senior medical officer at the Westmorland Sanatorium, Grange-over-Sands. In 1934, as consultant tuberculosis officer, he became responsible for the dispensary work in a large area stretching from Lancaster to Chorley with a population of 277,000. He was also visiting physician of the Lancaster Pulmonary Hospital. He retired from the county-council service in 1940, but continued to devote his time and energies to the interests of his profession, and last year served as chairman of the North-Western Tuberculosis Society.

DR. LOUISA GARRETT ANDERSON

As one who knew her first as a fellow-student and then, nearly 50 years later, in her home at Penn I am grateful that your sympathetic notice of Louie Garrett Anderson should distil for others something of the fragrance of her character as well as its strength and versatility. "Courage, integrity and humour" were never better shown than in the laying aside of the lovely country setting she had created, for the purlieus of the Euston Road with the onset of war. The suffragette, the war surgeon, the biographer, the gardener, at the end of her life was content to see that "all was well (after the bombing) and to wish everyone God-speed" in the hospital associated with her name. Very appropriately it served her own need when her first and last illness developed. Writing within a few days of her passing she spoke of welcoming death at 70 rather than otherwise. She paid tribute to "a very happy life, with a most interesting profession and during the last war a great chance." Rich endowment and opportunities gladly appreciated and greatly used make indeed for the good life.

E. L. C.

Appointments

ANDREW, DOUGLAS, MD BRIST., DMR: radiologist to the Battersea General Hospital.

COOKSEY, F. S., MD LOND.: part-time director of physical medicine at St. Helier County Hospital, Surrey.

GOLDING, F. CAMPBELL, MB SYDNEY, MRCP, DMRE: director of the X-ray diagnostic department of the Royal Cancer Hospital (Free), London.

IREDELL, C. E., MD LOND., MRCP: part-time director of physical medicine at Kingston County Hospital, Surrey.

KOLLER, P. C., D SC: research histologist in the pathological department of the Royal Cancer Hospital (Free), London.

LANGSTON, H. H., MB LOND., FRCS: orthopædic surgeon to the Southampton Children's Hospital.

LILLIE, H. S., MRCS: examining factory surgeon for Winterton, Lincs.

RIGGALL, R. M., MRCS: deputy medical superintendent to the City of London Mental Hospital, Dartford, Kent.

ROBERTS, NORMAN, M CH ORTH. LPOOL, FRCS: orthopædic surgeon (temp.) to the Liverpool Royal Infirmary branch of the Royal Liverpool United Hospital.

STUART, R., MRCS, DPH, DTM & H, DOMS: examining factory surgeon for Harrold, Beds.

Births, Marriages and Deaths

BIRTHS

BEDDARD.—On Nov. 24, at Windermere, the wife of Captain F. D. Beddard, RAMC—a daughter.

CLIMIE.—On Nov. 24, at Oxford, to Dr. Myra Climie (*née* Sutherland), wife of Squadron-Leader J. K. Climie, DFC, RNZAF—a son.

FAWKNER-CORBETT.—On Nov. 18, at Londonderry, the wife of Surgeon Lieutenant P. J. Fawkner-Corbett, RNVR—a son.

FOSS.—On Nov. 22, at Clifton, Bristol, the wife of Surgeon Lieut.-Commander George Foss, MD, RNVR—a daughter.

WENGER.—On Nov. 20, in Edinburgh, to Dr. Margaret Wenger (*née* Dow), the wife of Mr. R. A. L. Wenger, FRCS—a son.

MARRIAGES

LODER—STRATON.—On Nov. 24, at Wilton, Robert Edward Loder, lieutenant, RAMC, to Janet Straton, SRN.

MARTIN—STEWART.—On Nov. 11, in London, Thomas Dawson Masson Martin, MRCS, to Eileen Hannah Stewart.

DEATHS

BARKER.—On Nov. 25, at Berkhamsted, Francis James Barker, MD GLASG., consulting physician to the Hospital of SS. John and Elizabeth, London.

BEER.—On Nov. 23, Louis Edward Simon Beer, LSA, of Hampstead Road, London, N.W.1.

EASTMOND.—On Nov. 21, at Southsea, Reginald Anthony Eastmond, MB LOND., formerly of Mansfield Woodhouse, Notts.

FOWLIE.—On Nov. 26, at St. Andrew's, Fife, Peter Fowlie, MB ABERD., formerly of Singapore and Hampstead, London.

GILMOUR.—On Nov. 22, at Edinburgh, John Gilmour, CMG, MC, MB EDIN., FRCSE, brevet major RAMC retd.

PARKER.—On Nov. 22, at Kendal, William Rushton Parker, MD CAMB., aged 90.

TURNER.—On Nov. 28, at Wimbledon Parkside, Henry Strawson Turner, MC, MRCS, of Half Moon Street, London, W.1.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

Notes and News

AN UNOFFICIAL UNIT

THE Friends Ambulance Unit consists of about 800 men and women whose convictions debar them from combatant service. During the past year they have been working abroad in Egypt, North Africa, Syria, Ethiopia, India, China, and (as prisoners) Germany, while at home an average of 200 have made themselves useful, while gaining experience, in British hospitals. The training of members of the unit is thorough but varied, and in distant fields they have proved its worth by tackling unexpected duties. Even in the organisation of an army, the developments of war reveal new needs for which full provision could not be made in advance, and the unit has been a convenient source of supplementary personnel for blood-transfusion and other medical services of the MEF.

Its primary object is to fill gaps, and it is not deterred from the attempt by their gigantic size. Seven of its doctors, with 37 other members, are helping to create medical services in Ethiopia. Another small group is living and working in Syrian villages. A third is engaged on relief in India, helping refugees from Burma and trying to counter the ravages of floods, famine, and now cholera in Bengal. A fourth, with 66 members, is in China, where it maintains mobile surgical teams and distributes essential medical supplies through a vast territory: spare parts for the trucks are almost unobtainable but they are "still running, through summer heat and winter snow in the course of a single day, from jungle valleys to passes at 10,000 feet, between places as separated as London and Constantinople." At home members of the unit have filled another kind of gap by offering themselves as subjects of clinical experiments on the transmission of virus infections, the testing of malarial remedies, and the treatment of oligæmic shock.

With other agencies of the Society of Friends the unit is preparing itself, largely by practice, for difficult tasks in postwar relief. For such tasks Quakers are well qualified both by record and outlook. Meanwhile few will regret that, even before the war ends, reconstruction should be represented in many lands by a token force dedicated to that end alone, "in a spirit of reconciliation and faith in the essential brotherhood of man." Any who care to support the endeavour may do so by sending subscriptions to 4, Gordon-square, London, W.C.1. The members of the unit are unpaid.

A CHARTER FOR HEALTH

IN our issue of Aug. 28 (p. 276) we noted that the Anglo-Czechoslovak Founders' Committee is offering prizes for the best essay on an inter-Allied charter of health. The honorary advisory council, including Brigadier F. A. E. Crew, Prof. W. E. le Gros Clark, Prof. Lancelot Hogben, Sir William Beveridge, Mr. Jan Masaryk, Prof. John Ryle, Sir John Boyd, Prof. S. Zuckerman and others, are prepared to extend the period of entry until Dec. 31. Competitors are free to deal singly or jointly with two main issues:

1. A survey of postwar relief schemes and other measures for health planning.
2. Draft of a project to implement article 6 of the Atlantic Charter with reference to health.

Prizes are £30 and upwards, and the competition is open to doctors, biologists, research workers in services connected with health, nurses and medical auxiliaries. Entries should be forwarded to the Health Charter Study Group, 18, Grosvenor Place, S.W.1.

NURSES FOR RELIEF WORK

AT a meeting of the Council of the Royal College of Nursing on Nov. 18 it was decided to form a register of nurses wishing to help in relieving war-stricken countries when peace comes. The aim will be to supplement the national efforts of the countries concerned. The RCN is affiliated to the Council of British Societies for Relief Abroad, and will recommend suitable volunteers to those societies seeking state registered nurses for relief work. At the request of these societies the college would also verify the qualifications and suitability of any state registered nurse volunteering directly to a society. The college suggests that such societies should forward information to all volunteers applying to them, irrespective of whether the college has been asked to scrutinise the nurse's qualifications or not. The Leicester branch of the college has raised £100 to further relief work.

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RADIOTHERAPY IN LONDON

SOME difficulty has been experienced in providing irradiation treatment for cancer at hospitals in inner London, so arrangements have been made for both X-ray and radium treatment to be carried out at two hospitals in the London sectors—one north of the Thames, at Mount Vernon Hospital, Northwood, and one on the south side at Warren Road Hospital, Guildford. Patients from sectors 2–5 inclusive will, as at present, go to Mount Vernon, and the southern centre is now ready to receive patients from sectors 6–10. Only patients who are likely to respond to treatment should be sent to the centres, and transferring hospitals must be prepared to take them back if investigation at the centre shows them to be unsuitable for treatment there. The southern centre will be staffed by whole-time medical and technical staff, with visiting consultants from several of the inner hospitals, which are loaning radium and other equipment. Surgeons who wish to treat their own patients at the centre can do so by arrangement with the medical superintendent.

University of Oxford

In a Congregation held on Nov. 20, the degrees of B M, BCh were conferred on John Badenoch and Andrew Henderson Torrance (in absence).

Royal Society of Medicine

A meeting of the fellows of this society will be held on Tuesday, Dec. 7, at 4 PM. On Dec. 10 at 2.15 PM the clinical section will meet at the Brompton Hospital, Fulham Road, S.W.3. The house and library will be closed from Dec. 25 to 27, both days inclusive.

Pharmaceutical Society of Great Britain

At a meeting to be held at 17, Bloomsbury Square, London, W.C.1, on Tuesday, Dec. 9, at 7 PM, Mr. Arthur Mortimer, MPS, deputy director of medical supplies to the Ministry of Supply, will speak on the ministry and its relation to the pharmaceutical industry.

Discharged Service Patients

The Minister of Health has now decided (circ. 2530C) that men and women invalided from the Forces and not entitled to a pension, when admitted or transferred to an EMS hospital, will remain an EMS responsibility until their treatment is completed or for six months whichever is the earlier. If there has been a break in treatment and it becomes necessary within the six months to readmit the patient to hospital the regional hospital officer (or in London the EMS director at the ministry) should be consulted. A patient still receiving treatment six months after being boarded out will normally be dealt with as an ordinary civil case, with the proviso that essential treatment is not to be interrupted.

Jaundice made Notifiable

There is evidence of an increasing prevalence of the infective types of jaundice, and an intensive study of the epidemiology and pathology of the disease has been undertaken by a team working at Cambridge in collaboration with the Medical Research Council. To provide these workers with the fullest possible information about the incidence of the disease the Minister of Health has brought into operation in all districts in the Eastern region, where the research is situated, the Jaundice Regulation, 1943. These regulations make compulsory notification to the medical officers of health of cases of catarrhal jaundice, acute inflammation of the liver, acute necrosis of the liver, acute yellow atrophy of the liver, toxic jaundice and infective jaundice.

Town and Country Planning in Scotland

From Feb. 11, 1944, all land in Scotland will be subject to controlled planning and cannot be developed without the consent of a local planning authority. This broadly is the combined effect of the Town and Country Planning (Scotland) Act 1932 and the Town and Country Planning (Interim Development) (Scotland) Act 1943 which has just become law. The new act places the onus of seeking and securing local-authority approval for development proposals on the land-owner, who can, however, appeal to the Secretary of State if he feels aggrieved at consent having been refused. It also gives planning authorities a right to authorise the erection of buildings for a limited period and determines that these buildings can be pulled down at the end of the period without payment of compensation.

Leeds Joint Council on Industrial Medicine

This council, which is made up of representatives of the Leeds division of the BMA, of the trade unions, of the local branch of the FBI and of the local chamber of commerce was inaugurated in October 1942 to coördinate industrial medicine for the common good. During the year notes have been circulated to employers and trade unions on facilities for the treatment of scabies and pediculosis, on day nurseries, war-time nutrition and canteen feeding. Attention has been given to short-term absenteeism, medical certification and hours of work. The opinion has been circulated that for men and for women, where such women have no particular home responsibilities, a six-day week of 55 hours including overtime is the optimum; for women with home responsibilities a five or five-and-a-half day week would be desirable. Rehabilitation of disabled workers has been discussed with Government departments. Hospital authorities have been approached to obtain priority treatment for key workers; at the Leeds Infirmary a mixed committee has been appointed to oversee the arrangements. The appointment of works medical officers is being promoted and an extension of industrial nursing. The hon. secretary of the council is Dr. J. Vaughan Jones, 161, Hyde Park Road, Leeds 6.

Workmen's Compensation

Since last Monday many workmen receiving weekly payments under the Workmen's Compensation Acts will be entitled to an increase in the supplementary allowances granted under the Act of 1940. Where weekly payments have been made for thirteen weeks or more the increases are, for a single man or woman, 5*s*. per week, making a maximum of 40*s*., and for a married man 15*s*. per week making the maximum 50*s*. There is also an increase of 5*s*. for the married man during the first thirteen weeks. Total compensation to totally disabled workmen must not ordinarily exceed two-thirds of the workman's pre-accident average weekly earnings. The allowances for children are increased to 5*s*. for each child born before the accident or within nine months thereafter, and under 15 years of age, and a concession has been made for children of 15 receiving full-time instruction in a school. These allowances must not increase the total compensation for total disablement to more than seven-eighths of pre-accident earnings. In fatal cases the minimum payable where adult dependants are left is increased from £200 to £300 and the maximum from £300 to £400; and where children under 15 are left in addition to an adult dependant the aggregate maximum is increased from £600 to £700.

Medical Casualties

The following RAMC officers have been posted as prisoners of war:

Captain F. E. de W. Cayley, MRCS; Captain A. K. Eastwood, MRCS; Captain R. M. J. Franks, LMSSA; Major A. C. King, FRCS; Captain James Ledingham, MB ABERD.; Captain M. T. O'Sullivan, MRCS; Major T. M. Pemberton, FRCS; Captain J. Richardson; Captain P. G. Seed, MRCS; Lieut.-Colonel J. H. Strahan, MB BELF.

Medical Honours

The following awards have been made to RAMC officers in recognition of gallant and distinguished services in the Middle East:

CBE.—Brigadier R. W. Galloway, DSO, MB ABERD.

OBE.—Lieut.-Colonel C. W. Arnot, MC, MD DURH.; Lieut.-Colonel D. W. Jolly, MB NZ; Colonel F. R. H. Mollan, MC, LRCPI; Colonel J. G. Morgan, MB; Lieut.-Colonel A. N. B. Odbert, MB DUB.; Lieut.-Colonel P. J. Richards, MRCS; Lieut.-Colonel R. MacL. Savege, MC, FRCSE; and Lieut.-Colonel H. S. Ward, MRCS.

MBE.—Major A. J. C. Latchmore, MB LOND.

The George Medal has also been awarded to Lieut.-Colonel R. McI. Gordon, DSO, DFC, MC, MB GLASG., in recognition of gallant conduct in carrying out hazardous work in Middle East in a very brave manner.

". . . In most teaching schools the public health course still consists of a series of lectures spread over a single term in the student's curriculum, usually in the final year. Whilst the subject matter has increased enormously in scope and complexity during the past quarter of a century the time devoted to it remains the same. No attempt is made to correlate preventive and social medicine with the other subjects which the student has to learn. Nor is he invited to study his patients in relation to their family, industrial or social background. This is not surprising when all his teachers, with the sole exception of the lecturer in public health, are trying to cure rather than to prevent. Before reforms can become effective a new generation of professors and clinical demonstrators will need to grow up and the entire medical curriculum must be revised."—Dr. R. H. H. JOLLY in a presidential address to the Society of MOH's on Nov. 26.

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HEALTH OF THE FACTORY WORKER IN WARTIME *

S. A. HENRY, MD CAMB, MRCP, DPH, DTM
HM MEDICAL INSPECTOR OF FACTORIES

WHAT I shall here describe to you is the result of work performed not only by myself, but more so by colleagues both inside and outside the Ministry of Labour, while I act only as the mouthpiece. Such team-work does not call for reference to each individual name, but I would be failing in my duty if I did not pay tribute to the work and guidance of Dr. J. C. Bridge, until recently senior medical inspector. I can best explain my attitude by using what I am informed was one of the favourite quotations of a great surgeon: "I have gathered a posie of other men's flowers and nothing but the thread that binds them is mine own."

There are over a quarter of a million factories in this country, and the term "factory" is defined in the Factories Act as embracing not only the familiar mill building in which work is carried on by way of trade or for purposes of gain, but also a number of other premises in which persons are employed in manual labour such as a dry dock for shipbuilding and repairing, a factory line or siding, and even a gasholder. Mines and quarries are outside the scope of the Factories Act, and of them I have no right to speak.

But the act has special application to certain premises which do not come within the definition of a factory, such as an electrical station, a dock warehouse, a wharf or quay or wet dock for loading and unloading ships, a building under construction, and works of engineering construction.

Though factory workers—of whom there are some 7½ millions—may run the risk of some special accidents and maladies which are more or less peculiar to their employment, they are also liable, when returning home or to the outer world after the day's work, to contract those forms of ill health which are found in the general population whose guardian is the Ministry of Health, and of which the incidence is so much greater than that of the special maladies of industry of which I wish to speak mainly today. For every case of industrial disease or gassing in this country, there are over 50 cases of tuberculosis and over 500 cases of infectious disease.

It may even be that the worker in a clean, well-ventilated, well-lighted and well-organised factory with welfare and canteen facilities provided and used, is less likely to contract therein the common illnesses to which all human beings are subject than in the overcrowded bus, railway carriage, place of entertainment, air-raid shelter, or even the home both of rich and poor.

At present it may not be amiss to view through military spectacles the factory worker's bodily injury (which in the Factories Act includes injury to health) as caused by an enemy which has to be fought and overcome. But before we can do this we must know the identity of the enemy—whether it be dangerous machinery, a micro-organism, a ray, or a toxic dust, liquid, or fume—where he lurks and in what strength he exists.

This information is obtained by means of statutory notification of accidents and industrial disease to the Factory Department—a "department of intelligence," if I may say so—whose inspectors also act as military police, backed by the powers of the Factories Act, though as the Minister of Labour and National Service has recently pointed out their rôle has of late years tended to become more that of the welcome adviser to employer and employed, with sanctions in the background.

Though the earliest factory legislation in this country was aimed at the prevention of fatigue from long hours of work in badly ventilated factories, the prevention of accidents has for years been by far the best-recognised problem of the factory inspectorate. The Chief Inspector is usually a trained engineer, though at the end of the last century a medical man occupied the post on one occasion—Sir Arthur Whitelegge, a man of great administrative ability and a fellow of this college.

He recognised the necessity for including a medical adviser in the factory inspectorate in the person of Thomas Morison Legge, the first medical inspector of factories, on whom this college bestowed the Bisset Hawkins gold medal in 1924 in recognition of his fight against industrial disease, especially lead poisoning. His era will be considered by many, including those few remaining medical inspectors (Dr. Middleton, Dr. Horner, and myself) who had the honour of working under him, as the "golden" era, rather than the "lead" era, of industrial medicine, for his strongly laid foundations will remain, however often the edifices built upon them may be extended, destroyed or rebuilt in some other way.

ACCIDENTS

The term "accident" is not defined by the Factories Act and its legal interpretation in certain cases may have to be left to the courts, but speaking generally, it is an unlooked-for mishap or an untoward event, not expected by the sufferer; and its sudden occurrence can be related to a particular time. The main causes are mechanical, electrical, or chemical.

Machinery and allied accidents, which are by far the most numerous, are mainly an engineering problem and are dealt with, primarily, by the ordinary departmental inspector assisted by specialised engineering inspectors under a senior engineering inspector.

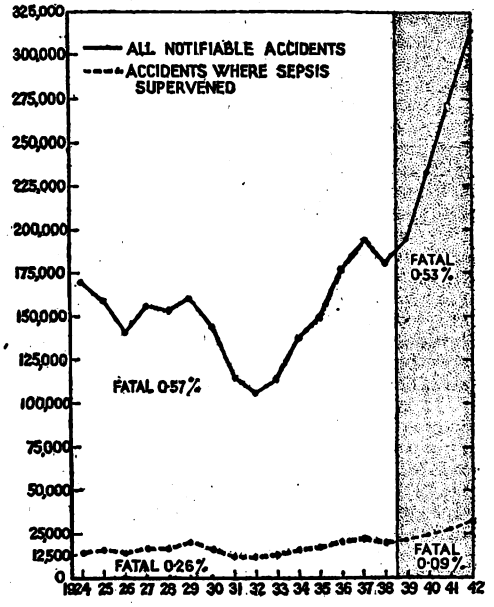

Fig. 1—All notifiable accidents compared with the numbers in which sepsis supervened.

Official figures for accidents in factories are based on notification, which is only statutory for those which are fatal, or which disable the workman for more than three days from earning full wages at the work at which he was employed. The statutory position was somewhat different before 1924, and the figures before that are not comparable with later figures; fig. 1 only shows the position from 1924 onwards.

The number of accidents from all causes has shown a progressive increase from nearly 193½ thousand in 1939 to nearly 312½ thousand in 1942; but needless to say the number of persons employed in factories has also progressively increased, and includes those previously unaccustomed to factory life and conditions. The percentage of fatal cases has fallen slightly from 0·57 before the war to 0·53 since the outbreak, during which period 15% of all accidents occurred in adult females and over 14% in young persons, male and female, under the age of 18.

The actual number of cases in which sepsis supervened has also increased from approximately 21½ thousand in 1939 to 32½ thousand in 1942, but not in proportion, as will be seen from fig. 2; in fact, the percentage of such cases to the total fell to 10 in 1941, which is the lowest percentage since 1925—the highest figure being 11·7 in 1936. Further, fewer cases of sepsis have proved fatal, for the percentage mortality has fallen from a pre-war average of just under 0·3 to just under 0·1 during the war; actually, 1942 provided the low percentage of under 0·05.

Electrical accidents, which are the main concern of the senior electrical inspector and his specialised staff, have

* The first of two Milroy lectures, delivered at the Royal College of Physicians on Feb. 23, 1943. The lecture will be concluded in our next issue.

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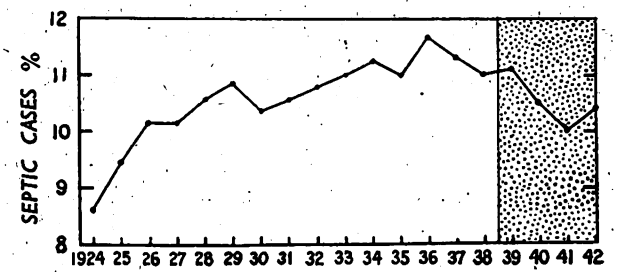

Fig. 2—Percentage of septic cases to total numbers of accidents.

increased in number since the war (fig. 3), reaching the figure of 1029 in 1942 as compared with the lowest figure of 313 in 1932. On the other hand, the percentage of fatal cases has fallen to a figure below 5 for the first time, the highest being 8·3 in 1929, and the lowest 4·3 in 1940 (fig. 4). I need only say in this connexion that the importance of continuing artificial respiration, if necessary for many hours until it is absolutely certain that life is extinct, can never be too widely advertised.

The causation and prevention of gassing accidents, which is the term in use for accidents caused by inhalation of gases, fumes or vapours, present important problems for the medical inspector in close coöperation with the specialised chemist of the engineering branch.

Fig. 5 shows the number of gassing accidents which have been reported annually since 1924. There was a considerable rise in 1940 and 1941, but whereas there was a mortality of 9·6% during the 15 years before the war, the percentage mortality during war has been 4·6. A few important gases have contributed mainly to this rise in incidence. The number of cases of gassing by carbon monoxide has risen progressively (fig. 6), both blast-furnace and power- or producer-gas contributing, while coal gas, and carbon monoxide from other sources such as exhaust gases from engines, or coke or charcoal-fire braziers or stoves (usually in a confined space as on board ship or even in one case in a lavatory) did not contribute significantly until 1941.

It is difficult to assess how many were due entirely to war conditions. The number of cases of gassing occurring during the performance of normal duties was mostly related to diminished ventilation consequent on structural alterations to prevent glare. Many occurred during blackout hours and several which were indirectly due to air-raid warnings or enemy action would certainly not have happened in peace-time.

The percentage of fatal cases during this war as compared with the average for the 15 years before has fallen from just over 10 to just over 8; but while the percentage for blast-furnace gas has fallen from 18·5 to 12·5, for producer gas from 7 to 5·5, and for coal gas from just under 9 to 5, that from other sources of carbon monoxide has risen from 7·5 to over 9.

At the beginning of this century a mysterious illness with a 23·3% mortality affected at least 120 human beings, a dog and a canary, during transport by water of high-grade ferrosilicon produced in an electrical furnace. The illness, which included giddiness, severe gastric intestinal disturbance and collapse, was at first variously diagnosed, and foul-play was even suspected in a fatal case in a Russian refugee. However, investigation eventually revealed the cause as phosphuretted hydrogen evolved by the action of moisture or moist air on the calcium phosphide present in the alloy.

During the last war, though gassing by phosphuretted hydrogen was anticipated in connexion with the preparation of calcium phosphide—used in considerable amounts for filling certain kinds of flare mines—no serious effects were observed. No cases were reported in the interval between the last and present war, but in 1940 there were 19 cases of such gassing without fatality; these might equally well have occurred in peace-time, since they were due to an unfortunate error: a ship's cabin was

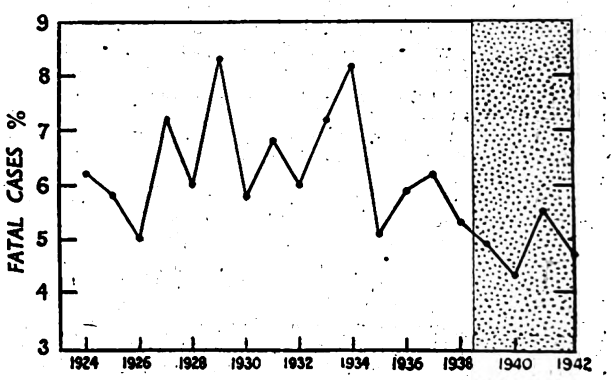

Fig. 4—Electrical accidents: percentage of fatal cases to total number.

being cleaned by spraying water, and some fell on an open tin of calcium phosphide which had been placed in the cabin by mistake.

But nitrous fumes have been responsible for much of the increase in the number of cases of gassing during the war (fig. 7). Fortunately, most of the cases have been mild, the percentage mortality being well under 1 as compared with 10 before the war. All but 14 occurred in the manufacture of explosives such as trinitrotoluol and trinitro-phenyl-methyl nitramine, formerly erroneously called tetranitromethyl-aniline (hence the name tetryl). Lack of experience among management and workers is an important factor in causation.

It is worth recalling that in 1934 an important new source of gassing by nitrous fumes came to light, 9

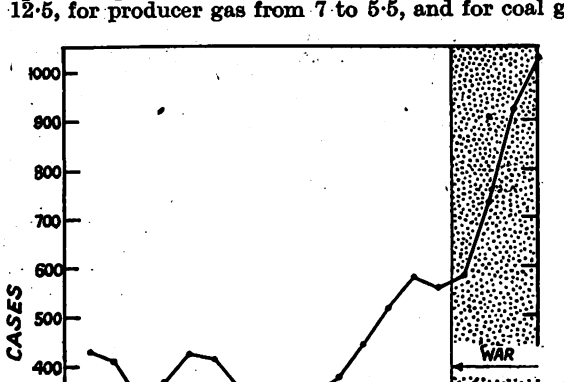

Fig. 3—Electrical accidents.

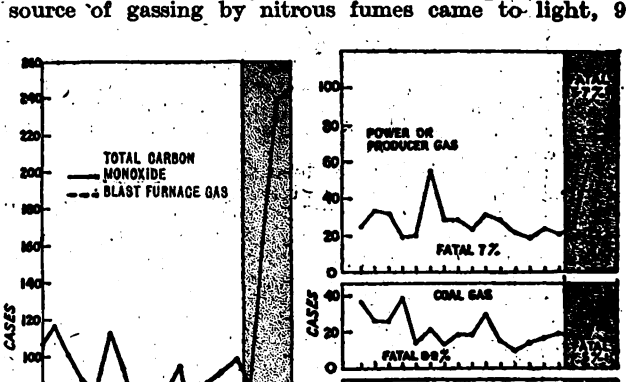

Fig. 6—Cases of gassing by carbon monoxide.

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cases being reported from the use of large oxy-acetylene burners on a liner, for the purpose of heating a heavy steel crosshead to expand it and so facilitate its removal from the rudder post; while 9 similar cases were reported in 1938 during the reverse process of replacing a crosshead or "shrinking it on." Chemical investigation by the government laboratory and a chemist of the factory department revealed that the fumes were the result of the high temperature flame on the nitrogen in the air. Since the war only 1 such case has been reported, again when a crosshead was being replaced.

INDUSTRIAL DISEASES

But there are certain substances which when inhaled or otherwise absorbed in sufficient quantity cause immediate effect, classified as an accident, but which, when absorbed in smaller quantities over a period, may cause a chronic effect with a different clinical picture. It may be necessary for purposes of compensation to schedule the more chronic effect as an industrial disease. Examples are to be found in poisoning by tetrachlorethane (causing toxic jaundice); diethylene dioxide or dioxan (causing hæmorrhagic nephritis); and, during this war, methyl bromide, scheduled on June 1, 1941, and tricresyl phosphate and triphenyl phosphate, scheduled on Aug. 1, 1942.

Between the end of 1940 and the middle of 1941, 3 workers who had been employed for periods varying from 8 months to 3¼ years in the manufacture of oily tricresyl phosphate or triphenyl phosphate, or both, for use as plasticisers in cellulose lacquers, were found to be suffering from a form of paralysis simulating infantile paralysis. It began with tingling and numbness of the calf muscles, the patients later developing foot-drop with a slapping gait and subsequently weakness of the upper limbs with difficulty in grasping. There was no doubt that the cases were similar to those of "ginger" or "jake" paralysis in America caused by accidental ingestion of ortho-tricresyl phosphate.

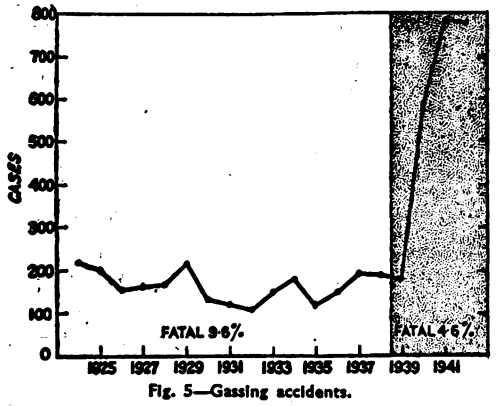

Fig. 5—Gassing accidents.

The first notified case of gassing by methyl bromide was in 1937 when a man who had been filling fire extinguishers for 6 weeks in the open air with this chemical suffered ill effects necessitating hospital treatment for 2 weeks. Since 1939, however, 13 cases have been reported, 3 of which proved fatal; 7 arose during the manufacture of the chemical and 6 during the filling of a fire extinguisher or as a result of accidental leakage from one.

In one man who died while engaged in the manufacture, the onset of symptoms seems to have been delayed. He collapsed and died on the road on the way home from work, and post-mortem examination showed cerebral and pulmonary œdema. Apart from local blistering of the skin, which is not uncommon without other signs or symptoms, the clinical picture is one of irritation of the alimentary and to a less extent of the respiratory tract; the central nervous system is seriously affected, with disturbance of speech and vision, headache, drowsiness, ataxia or even convulsions in some cases. In one case, a sample of cerebrospinal fluid was found by the Government chemist to contain 16 times the normal amount of bromine, which averages 1 mg. per 100 ml.

But this should not detract our attention from the selective action on the central nervous system of the important organic radical "methyl" which is also present in such industrial products as methyl iodide and methyl alcohol (methanol). In the past these and allied products, with the exception of methyl mercuric iodide, have shown no serious adverse effects, but in war-time, when exposure by day and night may be increased, our vigilance must be maintained; more products may eventually have to be transferred from the list of those causing accidents to that of those causing industrial disease. In 1941, for example, there was an isolated fatal case of gassing by methyl iodide, with effects rather similar to those of methyl bromide, in a man who had been employed at intervals in its manufacture for a year; and the effects of ingestion of methanol are already well known.

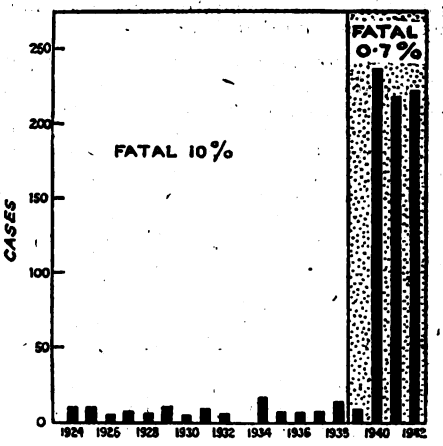

Fig. 7—Cases of gassing by nitrous fumes.

There has been a decided increase during the war in the number of cases of acute gassing from the anæsthetic vapour of trichlorethylene (fig. 8), the main increase (as it was in the prewar period) being in the process of metal degreasing.

Dry-cleaning was a prominent cause of gassing by trichlorethylene before the war, but the decline in this use is reflected in the absence of cases from this source since 1939. It was responsible for 2 fatal cases in that year, in which delayed action seems to have been associated with exertion. In one case a refugee trainee, aged 17, with a previous history of vomiting, employed as a dry cleaner, was found in his bedroom, dying, following a meal after a long day's work. The pathologist, in his evidence at the inquest, was of the opinion that the coma was probably precipitated by climbing four flights of stairs, and that the immediate cause of death was inspiration of material vomited during coma.

The other case was in an apparently healthy man of 20, who had for some time been subjected to rather heavy concentration of trichlorethylene vapour in dry cleaning. He left his work in the normal way, was found forty minutes later in the street near his home, deeply comatose, and died before reaching hospital.

Benzene (benzol) furnishes a link between accident and industrial disease, for while it may cause an acute gassing accident it may also cause a more chronic condition with a totally different picture, which has been scheduled as an industrial disease for compensation. In order to obtain information as to how and where it occurs, with a view to prevention, chronic benzene

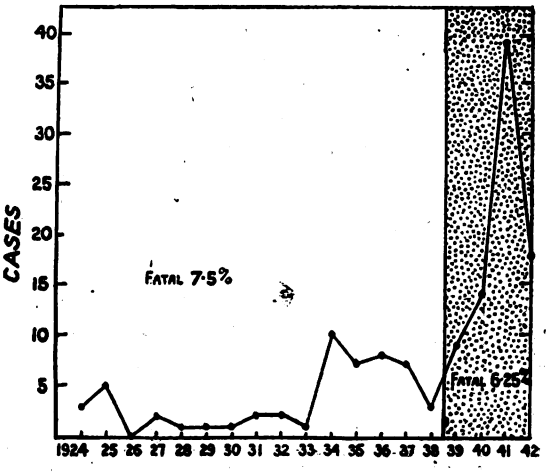

Fig. 8—Cases of gassing by trichlorethylene (C_2HCl_3).

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poisoning was added to the list of notifiable diseases, which now number 14.

NOTIFICATION OF INDUSTRIAL DISEASE

It would be illuminating if the Ministry of Information could tell us what percentage of the medical profession are aware that notification of any industrial disease is required, let alone the names of these 14 diseases on the list. They are lead, phosphorus, and arsenical poisoning and anthrax, from 1896; mercurial poisoning from 1899; toxic jaundice from 1916; epitheliomatous and chrome ulceration from 1920; carbon bisulphide, aniline and chronic benzene poisoning from 1925; manganese poisoning from 1936, compressed air illness from 1939, and toxic anæmia from 1942.

Fig. 9 gives some indication of the total numbers notified annually from 1913. Sometimes after preventive measures have resulted in reduction of numbers a new disease added to the list causes a temporary rise until again preventive measures have made themselves felt. But the rise during the present war is mainly due to the two effects of trinitrotoluol—namely, "aniline poisoning" and to a less extent "toxic jaundice."

Some industrial diseases require for their production many years of exposure to the causal agent, and therefore their manifestation during war-time has little or no relation to that period, but rather to a previous period. Hence I shall not make further reference to the non-reportable pulmonary diseases such as asbestosis, byssinosis of cotton-workers in processes preparatory to spinning, and silicosis, though these are subject to compensation under special schemes, or to fluorine osteosclerosis, or to cancer of the urinary bladder in makers of synthetic dyes; or to the notifiable diseases manganese poisoning in grinders of manganese ore, and epitheliomatous ulceration of the skin in workers in pitch, tar, bitumen or mineral oil.

I must make some reference, however, to cancer caused by arsenic. The disease notifiable is arsenical (and not arsenic) poisoning (fig. 10), which may, therefore, be interpreted as poisoning by any arsenical compound which occurs in industry in the form of dust, gas or vapour, though the resulting signs and symptoms may bear very little relation to one another.

Dust from such salts of arsenic as sodium arsenite, lead and calcium arsenate, and arsenic trioxide (white arsenic), to which workers are exposed in extraction of arsenic and in the manufacture of insecticides or weed killers, give the classical signs, and are responsible for 11 of the 12 cases occurring during this war. Of these 3 were fatal and presented in the final stage the feature, unrelated to war-time, of primary cancer of the lung preceded by primary keratotic new growths or epitheliomata on the skin of the trunk (which is the site of election of these cutaneous new growths) or on the lower limb, and, in one case, non-malignant perforation of the nasal septum. In previous years some half-dozen cases of cutaneous cancer—5 in sheep dip workers and 1 in a worker manufacturing emerald green—had been included. If the interesting suggestion proves correct that nasal and pulmonary cancer in nickel workers is attributable to contact in the past with an arsenical compound no longer used, such cases should presumably be notifiable under the heading of arsenical poisoning.

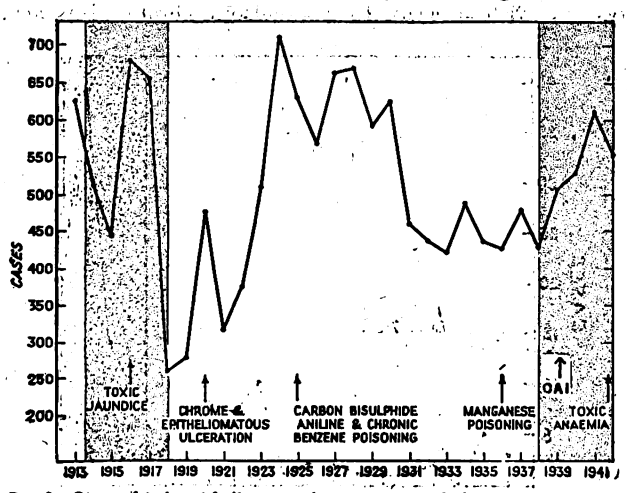

Fig. 9—Cases of industrial disease and poisoning notified since 1913. Lead, phosphorus, arsenical and mercurial poisoning, and anthrax, were all notifiable before that date. CAI = compressed air illness.

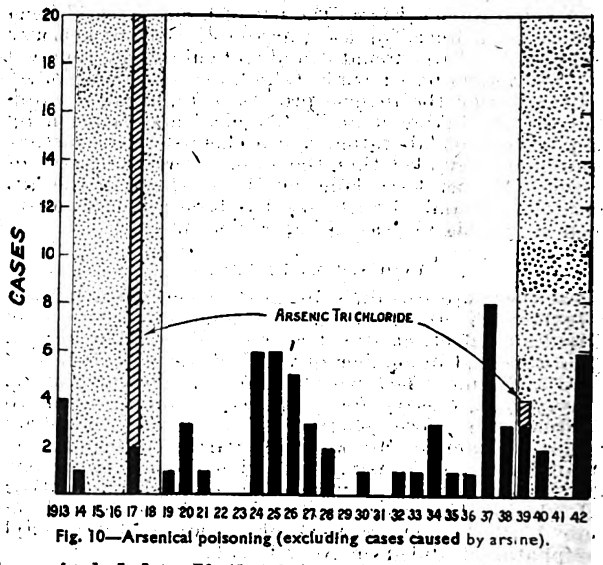

Fig. 10—Arsenical poisoning (excluding cases caused by arsine).

The vapour of arsenic trichloride may cause intense irritation of the mucous membranes and of the skin, causing ulcerative dermatitis. Although 18 of the cases included under the heading of arsenical poisoning during the last war were due to this product, manufactured for chemical warfare, the only case during the present war arose from the use of this chemical in the making of an anti-fouling paint. Death was from bronchopneumonia with some change in liver and kidneys. The use of this paint on ships will have to be borne in mind when, after the war, shipbreaking becomes commoner and the oxy-acetylene blow-pipe flame is used; the known lead hazard may then be augmented by an arsenical hazard.

Before 1916, when toxic jaundice became notifiable, cases of jaundice notified as attributable to arseniuretted hydrogen were included under arsenical poisoning, but since that date 59 such cases, with a mortality approaching 24%, have been included under the heading of toxic jaundice. Only 3 of these have occurred during the present war and none was fatal, as compared with 17 during the last war of which 6 were fatal.

But the most important chemical causing toxic jaundice is the explosive trinitromethylbenzene or trinitrotoluol, called for short TNT in this country; it has been christened tolite in France, trilit in Spain, and in some other parts of Europe trotyl or trinol. This chemical may produce a variety of effects. It may merely give rise to a condition which is not notifiable and is known as TNT sickness or gastritis, the symptoms being drowsiness, headache, nausea and abdominal pain. It may, or may not, be associated with cyanosis, which is a form of anilism and is notifiable as aniline poisoning. Thirdly, jaundice may develop, and the case is then notifiable as toxic jaundice. Fourthly, an anæmia of dyshæmopoietic type may occur, and the case is then notifiable as toxic anæmia. All these, when disabling, are subject to compensation under the heading of poisoning by nitro or amido derivatives of benzene. Lastly, there is the external effect of dermatitis which is not notifiable but is subject to compensation as "dermatitis produced by dust or liquids."

(To be concluded)

In medical education now the fundamental idea seems to be that there is something particularly degrading about sick folks and it is imperative that the student be kept away from such contamination as long as possible. . . . Of course *Paradise Lost* is a requirement and rightly so because it teaches the students that there was a hell worse than the premedical course, a thing difficult to comprehend.—ARTHUR E. HERTZLER, of Halstead, Kansas. *Anesth. & Analges.* 1943, **22**, 297.

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INFECTED BURNS AND SURFACE WOUNDS

THE VALUE OF PENICILLIN

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THIS war has produced surface wounds in large numbers. Many are burns caused by flame; others are injuries by bomb or shell fragments. In the early stages these two types of wound differ, but later they become similar.

For practical purposes two depths of burn should be distinguished, (1) the superficial burn with partial skin destruction, and (2) the deep burn with complete skin destruction.

In the absence of gross infection, superficial burns heal in 7–20 days. Repair is by regeneration of epithelial cells remaining in the depths of hair follicles and sebaceous glands (Barret Brown 1942). Destruction of the remaining skin layers by gross infection has the effect of transforming a superficial burn into a deep burn.

Deep burns and almost all the surface wounds of warfare destroy the skin completely and (unless skin grafts are used) they can heal only by epithelial growth from the edges of the wound. This paper is based on a large number of cases with complete destruction or loss of skin, of which 75 have been treated with penicillin during the last 15 months.

CONTAMINATION AND INFECTION

Three stages of infection may be distinguished:—

(*a*) *Contamination.*—In the early stages of a burn—whether caused by flame, acid or moist heat—the dead skin forms a protective layer. Immediately after the accident this is sterile, but early contamination from clothes, the surrounding skin, or the respiratory tract is common. In about 40% of the cases of burns received in this unit within 8 hours of the accident hæmolytic streptococci or pathogenic staphylococci have been cultured. This agrees with the findings of Cruickshank (1935) who reported that 11% of a series of 100 fresh burns were infected with hæmolytic streptococci and that by the end of the second day this figure had risen to 50%.

For 6 hours after burning these organisms do not invade the tissues but are simply contaminants. They can therefore be removed by a suitable cleansing and the use of an antiseptic.

(*b*) *Invasion.*—Within 48 hours, in the absence of effective cleansing, such organisms begin to invade the tissues and may give rise to all local and general signs of an acute infection.

(*c*) *Established infection.*—Without specific treatment, infection persists until the wound heals.

In burns the invasive period is usually prolonged. Its initial intensity tends to be reduced by the presence of skin sloughs, which afford protection and give time for a leucocytic barrier to develop. Even so, an intense and active invasion is sometimes seen, causing severe constitutional disturbance. With burns involving over a quarter of the body surface, such an invasion is fatal. There is accumulating evidence that infection is the cause of many deaths after the second or third day.

With surface wounds of mechanical origin the immediate exposure of living tissues—unprotected by the skin sloughs that cover a burn—increases the risk of active invasion. But this danger is offset by the fact that the first-aid treatment of wounds is generally better than the first-aid treatment of burns and that the importance of early wound toilet is widely appreciated.

FLORA OF SURFACE WOUNDS

Hæmolytic streptococcus.—The incidence of this organism has been variously reported as from 30% to 80%, and this fits in with my findings in 150 major burns and many other surface wounds. Hæmolytic streptococci are responsible for the most serious of the local and constitutional disturbances. They often stop the growth of epithelium or even cause regression of the healing edge; skin-grafts do not take and freshly healed skin may break down. Nevertheless they sometimes live on a wound undetected until swabs are taken and cultures made. In these cases the organism behaves as a harmless resident; but it may become active again at any time either spontaneously or after surgical interference with the wound.

Though the hæmolytic streptococcus is often resistant to local application of sulphonamides, it has not resisted penicillin (in adequate dosage) in any of the cases under my care. This is important in view of the ease with which it can travel from case to case and the frequency with which this used to happen.

Staphylococcus aureus is the organism most commonly found on burns and surface wounds; indeed its incidence is almost 100%. During the invasive period it may cause a severe local and general reaction; and though, in established infection, it may have little or no retarding effect on epithelial growth, there is a risk, even in late cases, that a reaction may develop if the wound is disturbed surgically. The mechanical action of the pus produced by the staphylococcus is a common cause of failure of skin-grafts; if pinch or divided grafts of postage-stamp size are used about half the grafts are likely to take in the presence of this infection (Bodenham 1943). Otherwise this organism is less to be feared than the hæmolytic streptococcus. It is almost completely resistant to local application of sulphonamides in any form but is highly sensitive to penicillin.

Bacillus pyocyaneus is rarely a primary invader; it appears from about the 5th day onwards, usually in company with streptococci or staphylococci. In large surgical wards full of open wounds or burns the tendency to spread is so great that the incidence is almost 100% unless infected cases are isolated. Though it does little to retard epithelial growth, it is responsible for considerable pus production. Elimination of streptococci and staphylococci from extensive surface wounds by penicillin shows that pyocyaneus alone can induce toxæmia and pyrexia. The large quantity of pus produced may "float" skin-grafts away from the unhealed surface; but, though it has been found in about 80% of the 75 cases reviewed, skin-grafting has been freely carried out in its presence and with fair success.

Bacillus proteus, too, is rarely a primary invader. It forms pus liberally with little retardation of wound healing. Its effect on skin-grafts is similar to that of pyocyaneus. Its incidence varies greatly from one hospital to another, and at different times in the same hospital. In this unit it reached a peak of almost 80% in 1942, but during the first 10 months of 1943 it has been approximately 10%. Both proteus and pyocyaneus are insensitive to sulphanilamide and to penicillin.

Bacillus coli has seldom been isolated in this unit and has presented no problems. *Diphtheroids* are occasionally found as saprophytes. The *anaerobes* have not been specially investigated and it is unlikely that they play any significant part in these wounds, though gangrene in burns has occasionally been reported (Moroney 1941).

PREVENTIVE TREATMENT OF WOUND INFECTION

Contamination of wounds before reaching hospital can be lessened by simple measures. The following first-aid precautions are advocated for this country where transport is available and distances are short.

1. Do not remove clothes by dragging them over injured parts. They should, if necessary, be cut away from the wound. Clothes covering burns are often heat-sterilised and are better left for removal in hospital.
2. Cover the part with sterile dressings. If these are not at hand it is better to use a clean towel rather than leave the burn (or wound) exposed.
3. Transport the patient with all speed to hospital.

MANAGEMENT OF BURNS IN HOSPITAL

The following procedure has given encouraging results.

1. Rapidly assess the extent and nature of the injuries.
2. As soon as the general condition permits, gently but thoroughly clean the whole injured surface and a wide area around it with 0·75% 'Cetavlon' (ICI) (cetyl trimethyl ammonium bromide).
3. Remove loose epithelium and dirt with instruments, using full aseptic technique. If blisters are intact they are better left alone. If they are damaged then they should be cut away.
4. Clean the whole area again with cetavlon.

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5. Cover the injured surface with preliminary cleansing cream (Colebrook 1942) which consists of sulphonamide 3%, and cetavlon 1%, in lanette wax SX and neutral-oil base.
6. Dress with tulle-gras, gauze and cotton-wool. It is important that the dressings be carefully applied to exclude any possibility of infection entering at the edges. Bandages should be firmly applied to support the injured tissues and if possible the part should be raised to reduce œdema. The dressings must not be allowed to slip.

These dressings may be safely left for 5–7 days. But if local pain and tenderness, regional adenitis, or signs of toxæmia suggest infection they should be removed and swabs taken for culture. A temperature of 100–101° F. is usual with extensive burns and injuries, even when they remain sterile throughout; this pyrexia of injury lasts from 3 to 6 days. A rise of temperature occurring with mild injuries, or pyrexia above this limit with extensive injuries, indicates local infection.

The accepted principles of treatment—immobilisation and free drainage of the infected part—must not be overlooked. Where there is infection of extensive wounds it may be impracticable to treat it by local specific therapy. The general condition of the patient may be seriously upset by the necessary changes of dressings. For these cases the administration of a sulphonamide by mouth is advocated and injections of penicillin are envisaged when supplies become available.

About the 5th to 7th day the dressings are changed and swabs are taken. The injured surface is again cleaned with 0·75% cetavlon. The blisters are cut on the 6th day, when most of these mild burns will be healed. The areas more deeply burnt are dusted with sulphonamide powder and covered with tulle-gras, gauze and cotton-wool dressings.

Superficial burns rarely become infected under this régime. A few staphylococci and pyocyaneus may be cultured, but pus and local inflammation are absent. With deeep burns a slow invasion with a low-grade infection is usual for about 3 weeks. After the first change of dressings further changes are made at intervals of 3–7 days. Separation of sloughs is assisted with forceps.

Epithelium grows across surface wounds very slowly unless the healing edge is kept clean. In the absence of infection this is simple, and the dressings are changed every 5–7 days. If infection is established, daily change of dressings is needed to maintain the best conditions for growth of epithelium.

For skin losses of more than a few square centimetres, skin-grafting greatly accelerates healing. It is particularly useful in burns, since they are on the whole larger than wounds of mechanical origin.

Ideally, infection is avoided and grafting carried out at once. This is sometimes possible in wounds of mechanical origin, and (more rarely) in deep but small burns. But infection occurs in almost all large surface wounds (Heggie and Heggie 1942) if they do not heal within a fortnight, and our object must be to prepare their granulating surfaces for skin-grafting as rapidly as possible. The problems are similar for burns and for wounds, and the same technique of dressings should be adopted. Wounds are usually tender so long as infection persists, but they are rarely tender when it is controlled.

Firm pressure helps to prevent the overgrowth of granulations. Epithelium will not grow across an uneven surface, and one must aim at uninfected flat even granulations.

SULPHONAMIDES APPLIED LOCALLY

Sulphonamides were first applied locally to wounds on a large scale in the battle casualties of 1940. Their use became widespread, and over-confidence in them often led to neglect of surgical principles. It is now clear that though they are an aid to wound management, they cannot replace it. Matthews (1942) has shown by bacterial counts their value in burns; they reduce the infection but do not eliminate it.

Sulphonamide-resistant strains of hæmolytic streptococci are sometimes encountered (Francis 1942). There may be *p*-aminobenzoic acid or similar antagonistic substances in the pus; or the organisms may develop a resistance to sulphonamides; or they may be resistant from the start.

Against the staphylococcus the sulphonamides exert only a limited action when applied locally; the best is sulphathiazole, but in comparison with penicillin its action is slight. Infection with *B. pyocyaneus* often persists when either sulphonamides or penicillin is used.

Until the supplies of penicillin are adequate, the sulphonamides should be tried first. This has been done, with few exceptions, throughout the present series of cases.

LOCAL APPLICATION OF PENICILLIN

The penicillin has been supplied as a calcium salt in powder form (Florey 1943), the potency in Oxford units varying from 6·8 to 163 units per mg. So little penicillin is required that it was found extravagant to apply the

TABLE I—SCHEME OF LOCAL PENICILLIN THERAPY

Type of infection	Strength	Applied
1. Active intense infection; pus profuse. (After first negative swab treat as 3.)	Cream 200 units per gramme; this yields 8 units per sq. cm.	Every 24 hours
2. Established infection; pus profuse	Cream 100 u/g. (4 u/sq. cm.)	Every 24 hours
3. Established infection; pus slight or moderate	*Cream* 100 u/g. (4 u/sq. cm.) Or when dry conditions are wanted:— *Powder mixture*: 1000 u/g. applied as frosting yielding 4 u/sq. cm.	Every 48 hours Every 24 hours

(1 g. cream lightly spread covers an area 5 × 5 cm.)

powder undiluted to the wound. In addition it proved impossible to estimate accurately the amount applied per square centimetre. Accordingly I began to use penicillin diluted to a standard potency either (*a*) in a sterilisable powder of neutral reaction, or (*b*) in a neutral ointment base.

The powder mixture.—Powdered sulphanilamide was chosen as the diluent. Sulphanilamide mixed with 5% (weight for weight) light magnesium oxide can be autoclaved at 5 lb. for 20 minutes without caking. The penicillin is added, after autoclaving, in the cold state by simply shaking the two powders together; it mixes rapidly. Enough penicillin is used to give a strength of 1000 units per gramme of the mixed powder. When this mixture is spread on a surface as a light frost, in the same way as sulphanilamide is commonly employed, there are approximately 4 Oxford units of penicillin per sq. cm. of wound. This is the same amount as is applied when a thin layer of cream of 100 units per g. is use.

The cream.—The cream base advocated by Colebrook (Clark et al. 1943) was tried. Prepared in the manner recommended, it is satisfactory; but after autoclaving it tended to separate into oil and lanette wax. A base of soft paraffin and lanette wax with water has proved more convenient and has been used throughout. It consists of equal parts of soft paraffin, lanette wax SX, and water, mixed at 140° F. and put into capped glass jars. Each jar is only half filled. The jar, with cap on, is autoclaved at 10 lb. for 30 min. and during cooling is shaken several times. A good cream base results. Penicillin solution at a strength of 500 units per c.cm. is stirred into this to give a final strength in the cream of 100 units per g. The result is a yellow cream which is easy to spread. The stiffness can be varied by altering the water content, but the cream described above is quite satisfactory. It can be frozen solid to preserve the potency of the penicillin if it is not wanted at once.

As the base is miscible in all proportions with water the cream can be readily removed with water alone.

The powder seems to be less effective than the cream, perhaps because it rapidly dissolves in the tissue fluids and the penicillin is quickly absorbed. In the cream the penicillin is dissolved in the water phase of the base and finely dispersed: it is not available for immediate solution in the tissue fluids; so its action is spread over 24–48 hours.

If a wound is covered with the cream for more than a week it tends to become soggy and epithelial growth is slowed. This sogginess can be limited if the cream is spread on tulle-gras which has itself been laid on a piece of 6-inch bandage; tulle-gras and bandage are both laid

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TABLE II—RESULTS

S=sulphanilamide; DD=dry dressing; Pp=plaster; M=mercurochrome; SP=soft paraffin

—	Site and area (sq. cm.)	Age of wound (days) and previous treatment	No. previous positive swabs		Frequency of application (hours)	Powder or cream (units per g.)	No. of days the swabs negative		Clinical progress
			Strep.	Staph.			Strep.	Staph.	
Group I Penicillin powder	Hand (18)	47 (S)	5	5	48	P (35,000)	2	6	Healed 20 days
	Foot (15·5)	34 (S)	4	4	48	P (35,000)	2	2	Healed 30 days
	Arm (62)	60 (S)	3	3	48	P (35,000)	6	2	Trt. stopped after 2 neg. swabs; infection returned
	Stump (3·5)	21 (S)	2	2	48	P (10,000)	9	3	Healed 20 days
Group II Penicillin—sulphanilamide powder (1000 units/gramme)	Arm (180)	96 (S)	2	—	24	P (1000)	2	—	Graft 60% take
	Hand (40)	6 (S)	—	1	48	P (1000)	—	10	Graft 15% take
	Leg (45)	180 (S)	2	2	24	P (1000)	7	—	Healed 25 days
	Leg (30)	90 (S)	2	2	24	P (1000)	5	—	Graft 90% take
	Face (100)	10 (S)	—	1	24	P (1000)	—	4	Healed 20 days
	Face (50)	10 (S)	—	1	24	P (1000)	—	2	Healed 18 days
	Buttock (36)	7 (S)	—	1	24	P (1000)	—	8	Graft 95% take
	Arm (9)	7 (S)	1	1	48	P (1000)	11	11	Healed 20 days
	Face (100)	10 (S)	1	—	48–72	P (1000)	25	—	Greater part healed; Graft 90% take on rest
Group III Penicillin cream (120 & 100 units/gramme) every 48 hours	Stump (42)	7 (DD)	—	2	48	C (120)	—	Uncontrolled	Profuse discharge; no change
	Hand (2)	52 (S)	3	—	48	C (120)	2	—	Healed 14 days
	Abdomen (8)	21 (S)	2	2	48	C (120)	4	8	Healed 8 days
	Leg (10)	180 (S)	4	—	48	C (120)	4	—	Healed 17 days
	Leg (2)	35 (S)	3	3	48	C (120)	4	7	Healed 12 days
	Arm (60)	17 (S)	3	3	48	C (120)	6	6	Graft 90% take
	Foot (6·5)	35 (S)	—	2	48	C (120)	—	6	Healed 10 days
	Back (200)	18 (S)	—	2	48	C (120)	—	6	2nd–3rd degree burn. Healed 16 days
	Back (36)	21 (S)	2	2	48	C (120)	2	2	Graft 60% take
	Arm (120)	24 (S)	2	2	48	C (120)	7	7	Graft 90% take
	Back (130)	120 (S)	—	3	48	C (120)	—	7	Graft 95% take
	Stump (6)	14 (S)	2	2	48	C (120)	8	Uncontrolled	Sequestrum discovered later
	Stump (10)	42 (S)	2	1	48	C (120)	Uncontrolled	—	Profuse pus
	Hand (18)	10 (S)	—	1	48	C (100)	—	6	Healed 20 days
	Hand (140)	14 (S)	2	—	48	C (100)	19	—	Graft 70% take
	Hand (160)	14 (S)	2	2	48	C (100)	6	26	Graft 90% take
	Foot (36)	28 (S)	2	—	48	C (100)	6	—	Graft 90% take
	Leg (400)	120 (Pp)	4	—	48	C (100)	5	—	Patch graft 40% take; granulations fibrous
	Hand (15)	16 (S)	—	1	48	C (100)	—	2	Healed 14 days
	Hand (25)	16 (S)	2	2	48	C (100)	10	6	Healed 18 days
	Foot (36)	15 (S)	—	1	48	C (100)	—	2	Healed 14 days
	Hand (40)	6 (S)	2	1	48	C (100)	9	7	Healed 12 days
	Hand (60)	6 (S)	2	1	48	C (100)	9	7	Healed 26 days
Group IV Penicillin cream (100 units/gramme) every 24 hours	Leg (300)	72 (S)	—	4	24	C (300)	—	4	Patch graft 80% take
	Scalp (170)	28 (S)	2	3	24	C (100)	2	4	Graft 50% take
	Arm (350)	30 (S)	2	—	24	C (100)	2	—	Pinch graft 70% take
	Hand (64)	32 (S)	2	1	24	C (100)	2	—	Graft 20% take
	Leg (20)	28 (S)	1	1	24	C (100)	2	2	Healed 16 days
	Hand (20)	9 (S)	—	1	24	C (100)	—	8	Healed 14 days
	Hands (200)	21 (S)	2	2	24	C (100)	4	2	Graft 70% take
	Back (13)	56 (S)	—	2	24	C (100)	—	6	Graft failed
	Leg (300)	35 (S)	—	2	24	C (100)	—	7	Patch graft 95% take
	Leg (6·5)	100 (S)	3	3	24	C (100)	4	6	Healed slowly. Reinfection 6 days after penicillin stopped
	Stump (25)	14 (S)	—	2	24	C (100)	—	11	Healed 30 days
	Leg (10)	160 (S)	2	—	24	C (100)	—	5	Healed 20 days
	Stump (25)	60 (S)	2	2	24	C (100)	6	6	Healed except 1 × 2 cm.; later grafted
	Leg (110)	120 (DD)	2	2	24	C (100)	1	1	Healing very slow. Haemoglobin 40%
	Leg (24)	300 (DD)	—	2	24	C (100)	—	3	Healing slowly
	Leg (2)	60 (S)	2	2	24	C (100)	5	5	Healed slowly
	Foot (13)	400 (S)	2	2	24	C (100)	5	5	Healed slowly (3 months)
	Arm, hand (250)	7 (S)	—	2	24	C (100)	—	2	Graft 60% take
	Legs (120)	10 (S)	2	2	24	C (100)	6	2	Graft 95% take
	Face (20)	18 (S)	2	—	24	C (100)	4	—	Healed 18 days
	Scalp (20)	42 (S)	1	1	24	C (100)	3	3	Graft 70% take
	Hands (60)	10 (S)	—	2	24	C (100)	—	6	Healed 20 days
	Arm (10)	49 (S)	2	—	24	C (100)	2	—	Healed 5 days
	Heel (2)	21 (S)	2	—	24	C (100)	10	—	Healed 15 days
	Leg (7)	7 (S)	1	—	24	C (100)	4	—	Healed 14 days
	Leg (230)	14 (S)	2	—	24	C (100)	8	—	Patch graft 85% take
	Leg (350)	21 (S)	—	2	24	C (100)	—	6	Patch grafts 85% take
	Arm (70)	90 (S)	1	1	24	C (100)	4	4	Graft 60% take
	Foot (2)	10 (S)	1	1	24	C (100)	4	4	Healed 7 days
	Foot (2)	60 (S)	2	2	24	C (100)	5	5	Healed 14 days
	Leg (10)	70 (S)	2	2	24	C (100)	5	5	Healed slowly, broke down (back of knee)
	Leg (20)	21 (M)	2	2	24	C (100)	2	2	Healed 14 days
	Leg (6)	7 (S)	1	—	24	C (100)	3	—	Healed 9 days
	Foot (35)	14 (DD)	2	—	24	C (100)	2	—	Graft
	Arm (180)	49 (S)	2	—	24	C (100)	3	—	Patch graft
	Thigh (25)	15 (DD)	1	—	24	C (100)	2	—	Graft 75–85% take
	Arm (25)	50 (S)	1	—	24	C (100)	2	—	Healing slowly
	Scalp (8)	49 (S)	1	1	24	C (100)	2	2	Healing slowly
Group V Penicillin cream (500 units/gramme) at intervals	Legs (1500)	28 (SP)	2	2	96	C (500)	12	14	Treated 5, 3, 2, 2 days respectively. Patch grafts 80% take

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on the wound surface, and excess moisture can then escape from the wound.

Factors influencing dosage are :—

(1) *Amount of surface discharge.*—Much discharge dilutes the penicillin and washes it away.
(2) *Intensity of infection.*—A higher dosage is necessary during the period of invasion.

Table I is a scheme of treatment showing the minimum strength recommended and the minimum frequency of application.

Swabs should be taken away every 48 hours and skin-grafting should not be attempted until at least three consecutive swabs are negative.

The use of special treatment charts is advisable to simplify correlation of data. In all cases the following particulars were entered :

Name : Rank : Batch No :
No : Unit :
Description & size of wound : Synopsis of previous treatment :
Cause of wound : Organisms present :
Age of wound on commencing this treatment : Surface discharge type :

Date of applications and/or swab cultures	H. Strep.	H. Staph.	B. Pyocyaneus	B. Proteus	PROGRESS Penicillin—form of application	Approx. units used	Remarks including any general reaction to infection

RESULTS OF PENICILLIN TREATMENT

Table II gives a synopsis of the results.

In *group* I the powdered calcium salt of penicillin, applied every 48 hours, was found to eliminate streptococci and staphylococci from burns and surface wounds. None resisted adequate doses of penicillin, though many had been clinically resistant to sulphonamides. In practice so little powder was required that it was difficult to avoid wasteful excess.

In *group* II the cases were treated with penicillin mixed with sterilised sulphanilamide powder to a strength of 1000 units per gramme. This proved effective when applied as a light frosting every 24 hours. All powder preparations are liable to cause pain, though this does not last long and is rarely so bad that treatment has to be stopped.

In *group* III the cases were treated every 48 hours with cream containing 100 units per gramme. The results were more consistently satisfactory than those obtained with the powder. One case of streptococcal infection and two cases of staphylococcal infection remained uncontrolled after a fortnight's treatment. The response of the streptococci compares favourably with that reported by Clark et al. (1943). No comparable series of staphylococcal infections treated with penicillin has been reported.

In *group* IV the cream was applied every 24 hours and gave even better results. There were no failures.

Recurrence of infection.—Staphylococci usually reappear in cultures from the wound 5–7 days after penicillin treatment ceases. Streptococci reappear later and less often.

Sloughs.—Penicillin can deal with coccal infection in the presence of sloughs, but not if they cover the whole surface of the wound.

PENICILLIN AND SKIN-GRAFTING

The early removal of coccal infection reduces the delay before skin-grafting can be undertaken with good prospect of success. So many factors affect the take of grafts that figures must be very unreliable, but it can be safely said that results in this unit have improved since penicillin has been used.

Penicillin powder has been applied under grafts on non-infected surfaces as a prophylactic measure in 15 cases. No adverse effect on the percentage take was observed, and the method should prove valuable in the immediate grafting of wounds.

Preparation of surfaces.—Infected granulations show considerable improvement after penicillin treatment. In the absence of firm support, however, they tend to become œdematous and exuberant. They should be flat, smooth, and delicate, bleeding easily but not spontaneously, bright in colour and delicate in texture. These qualities are attained by control of infection combined with firm pressure. A last dressing of dry close-mesh gauze, applied 12 hours before operation with the firmest pressure that can be tolerated, together with elevation of the part, produces a good surface for grafting. If the granulations are old, it is useful to freshen the relatively avascular surface by curettage.

The tissue tolerance for penicillin is high, and in no case have either local or constitutional ill effects been attributable to its use. In early cases a particularly delicate velvety type of granulation is produced. Discharge is slight and mucoid. This is in marked contrast to the appearance of the granulations after the continued use of eusol and proflavine powder. Here the granulations are hard, tough and of the "coconut matting" type; skin-grafts take poorly and epithelium advances but slowly over the surfaces.

SUMMARY AND CONCLUSIONS

In first-aid for burns more care should be taken to prevent contamination.

Penicillin is more active than the sulphonamides in eliminating streptococci and staphylococci from burns and surface wounds. It removes streptococci which are resistant to sulphonamides.

Penicillin does not affect *B. proteus*, nor (in concentrations lethal to gram-positive cocci) *B. pyocyaneus*.

A cream base, formed with lanette wax and soft paraffin, and giving a concentration of 100 Oxford units per gramme, is the most effective and economical means of applying penicillin to burns and surface wounds. Applied every 24 hours it will usually remove gram-positive cocci from an infected raw surface within 4–6 days. Wounds tend, however, to become soggy after it has been employed for a week or more.

Where the surface exudate from a wound is only slight, or dry conditions are desired, a penicillin-sulphanilamide powder is suitable.

Penicillin in strengths up to 20 units per sq. cm. has no adverse effect on skin-grafts. Its use facilitates grafting of raw surfaces.

I am indebted to the Director-General of Medical Services, RAF, and to Group-Captain Barnes for permission to carry out this work. I also want to thank Prof. and Mrs. H. W. Florey for their continued interest and help, Dr. L. Colebrook and Mr. A. H. McIndoe for teaching me a great deal about wound management, and Squadron-Leader D. E. Price and Squadron-Leader A. C. T. Vaughan for the bacteriology of the swab cultures; also the Sister and nursing staff who have assisted in compiling the records.

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DETERMINING BLOOD-UREA CLEARANCE.—Knowing the volume of urine in c.cm. per minute, the blood-urea per 100 c.cm. of blood, and the urea concentration per 100 c.cm. of urine, one can with the aid of a formula and some arithmetic calculate the blood-urea clearance as a percentage of the normal value. For those who dislike the arithmetic, or distrust their ability in such sums, Morris C. Davis, MD, and Mildred Barnard, MA, have constructed a monograph (W. Ramsay, Melbourne, 6*d.*), with the aid of which and a ruler the clearance value can be readily reached. Proceeds from its sale are to go to the Alfred Hospital Clinical Fund for Students.

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MODERN (NON-VOLATILE) ANÆSTHESIA

OBSERVATIONS ON 1000 CASES

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ANÆSTHETIST TO PRINCESS BEATRICE AND ROYAL WATERLOO HOSPITALS AND TO EMS; CONSULTANT ANÆSTHETIST, LATE AMERICAN HOSPITAL IN BRITAIN

COMFORT and rapid convalescence for the patient should always be, after safety, the anæsthetist's major care. Until the last 15 years little progress had been made in anæsthesia in perfecting less toxic drugs or devising better apparatus. The strides made recently, however, in both these directions have been enormous, enabling the modern anæsthetist to offer his surgeon a high degree of comfort for his patient, an increased margin of safety, and widened surgical scope. Comfort for the patient facing what is for him a severe ordeal seems to have been sadly neglected in the past by the anæsthetist, whose attitude (presumably dating from the early days of anæsthesia when merely to be rendered unconscious was a boon) has taken it for granted that the induction of anæsthesia must normally be a horrible nightmare to all but the most insensitive, and recovery often be accompanied by nausea, sickness and physical misery inevitably prolonging convalescence; and furthermore that these evils are *necessary* to assure the patient's safety.

OBJECTIONS TO CHLOROFORM AND ETHER

The chief offenders against the patient's comfort and rapid convalescence are chloroform and ether—but are methods employing these and other volatile agents safer or even as safe as more modern ones? Chloroform is fortunately now almost universally recognised as being too poisonous for the production of surgical anæsthesia in human beings, after much bitter experience, particularly of death on the table.[1] Ether still seems to be a stumbling block because, having a wide margin of safety (*during administration only*, be it noted), it is the easiest to administer from the point of view of getting the patient off the table alive, and in apparently fair condition; that seems to have been the anæsthetist's chief criterion of success. Thus ether's contribution to postoperative mortality has gone largely unperceived, owing to the anæsthetist's custom of relieving his mind of all further responsibility once the patient was out of the theatre. If the anæsthetist of today expects to be entitled "specialist" he must follow up his patients and assume his share of responsibility for their postoperative condition. Ether's deceptive reputation for safety will then become plain. When a patient dies of chloroform poisoning there is often a dramatic exitus on the table; but consider middle-aged patients undergoing major surgery, or shocked casualties. How many of these, despite first-class surgery and nursing, just fail to survive, dying of so-called "postoperative shock" after a long etherisation?

I contend that ether, though for many years the best and safest drug at our command, must now be classed as neither; nor does it produce the best results either for the patient's comfort or his rapid convalescence, in time of war a paramount consideration. In my view, therefore, ether is now best avoided wherever possible and in future should be eliminated altogether from our techniques. The following facts concerning the toxic and damaging properties of ether are quoted to support these contentions. Etherisation causes:

(1) Cardiac dilatation, weakened contractions,[2] myocardial relaxation,[3] and peripheral vasodilatation,[4] consequently ultimately lowering blood-pressure.[5]

(2) In patients in shock, further profound depression of the cardiovascular system by paresis and increased permeability of capillaries[6] (fig. 1, charts A and B; cf. charts A and B in fig. 2).

(3) Destruction of red cells, reduction of Hb up to 10%.[6]

(4) Paresis of entire gastro-intestinal tract, resulting often in considerable discomfort from "gas pains," and not rarely in acute dilatation of the stomach or paralytic ileus.[7 8]

(5) Albuminuria, "often with casts," in 25% of cases.[9]

(6) Considerable increase in H-ion concentration, hyperglycæmia and "acidosis."[10]

Cushny[11] has compared the cardiac dangers of chloroform and the respiratory dangers of ether on level terms as regards ultimate morbidity and mortality. Other observers[12] have shown that shock and death after intestinal manipulation in dogs occurred most rapidly after ether out of a number of anæsthetics (including 'Pentothal') used.

Experience during the first world war showed that 90% of the wounded who underwent amputation through the thigh in CCSs died after chloroform and/or ether anæsthesias, whereas such operations could be carried out at Base with comparatively low mortality.[13] It appears to be in the former circumstances that the use of ether has been so strongly advocated owing to its portability and ease of administration, whereas in the latter, improved facilities (thanks to the efficiency of modern drugs and apparatus) render its use largely unnecessary and mortality can thus be further reduced.[14] Kaye[15] in the Middle East quotes an incidence of 15% respiratory morbidity in soldiers after ether anæsthesia. Davies[16] found that the vomiting rate after N_2O-O_2-ether was 62%; when pentothal was substituted for ether it dropped to 28%. Nygaard's very comprehensive study[17] gives vomiting up to 72%, headache up to 15% after ether. Neither comfort nor convalescence are favoured by these sequelæ.

ADVANTAGES OF MODERN DRUGS

The intelligent use of modern drugs and apparatus can greatly improve the comfort and accelerate the recovery of postoperative patients. Increased safety in bad risks has already been demonstrated in a previous paper,[14] giving statistics of military casualties arriving from France, severely exhausted, many with gas gangrene and most without previous treatment. In the seriously wounded the mortality among those etherised was 18%; among the others it was nil.

Nitrous oxide is almost the earliest and certainly the weakest anæsthetic—but how transformed are its capabilities by modern apparatus and methods of premedication! Almost universally acknowledged as per se the least harmful agent known, having no perceptible effects on the body,[18 19] only by unjustifiable efforts to reinforce its power with anoxia can it damage the patient[19 20]; this is never necessary if it is supplemented by pentothal when an abundance of oxygen can be employed. Pentothal is also almost entirely

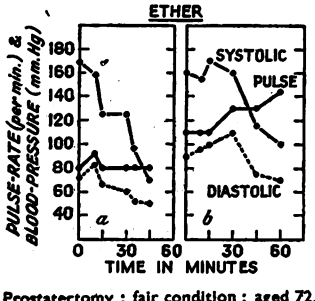

Fig. 1—(a) Prostatectomy; fair condition; aged 72. Pentothal 0·3 g. with N_2O-O_2 and ether 3½ oz. Boyle machine. (b) Laparotomy for subhepatic abscess; fair condition; aged 49. N_2O-O_2 (induction) with ether 8 oz. and O_2 (maintenance). Oxford Vaporiser.

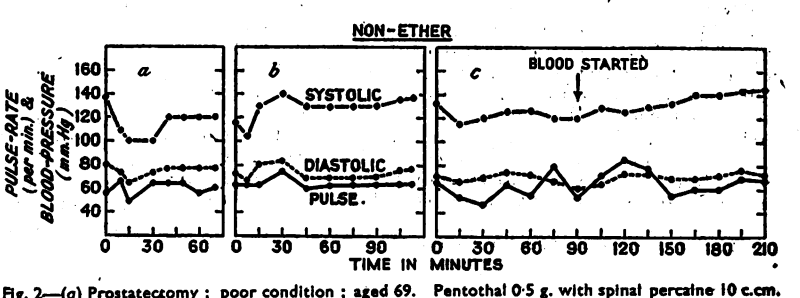

Fig. 2—(a) Prostatectomy; poor condition; aged 69. Pentothal 0·5 g. with spinal percaine 10 c.cm. and N_2O-O_2. Boyle machine. (b) Laparotomy for cholecyst-gastrostomy and jejuno-jejunostomy; fair condition; aged 49. Pentothal 0·3 g. with spinal percaine 15 c.cm. and N_2O-O_2. Boyle machine. (c) Laminectomy for removal of disc and spinal fusion; good condition; aged 24. Pentothal 0·5 g. with intratracheal N_2O-O_2. McKesson machine. Blood-transfusion 400 c.cm.

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non-toxic.[21] These two agents, allied or separately, can cover almost the whole field of extra-abdominal surgery as well as much abdominal work.

Experience of large numbers of air-raid casualties has repeatedly shown that pentothal-O_2, or with N_2O and high O_2 content (30–50%) is outstandingly successful. Many other anæsthetists have expressed the same opinion. This combination, supplemented further with cyclopropane (after N_2O probably the least toxic of all inhalation anæsthetics) further widens the field which can be covered. Finally these agents can be combined with the percaine spinal technique of Wilson [22] to produce abdominal relaxation incomparably better than anything obtainable with the deepest soaking in chloroform and ether, and with far less formidable after-effects. This combined technique, first described by Jarman,[23] almost entirely eliminates the disadvantages of unsupplemented spinals. Furthermore, in severe operations an unrivalled degree of protection from the effects of neurogenic [24] and psychic [25] shock is achieved.

The following is a summary of the routine techniques used to the total exclusion of chloroform, ether and the volatile agents generally.

(1) Intravenous pentothal, single dose, or "continuous" with the highly efficient apparatus of Macintosh and Pask.[26]
(2) Pentothal induction followed by N_2O-O_2, supplemented if necessary with small additional injections of pentothal or cyclopropane; with or without intubation.
(3) Pentothal induction followed by percaine spinal (or field block if spinal contra-indicated) and N_2O-O_2.

Pentothal makes induction entirely pleasant; true contra-indication is almost non-existent. In children of an age to fear venepuncture [27] rectal methods are substituted.

These sequences alone are sufficient for any anæsthesia problem, given patience in evolving techniques and a strong enough desire to improve the results of anæsthesia. The satisfactory results obtainable are seen in fig. 2.

Finally there is the question of "frontline" and "blitz" anæsthesia. For situations where bulky machines are impracticable, open mask anæsthesia has been much advocated. We have seen what a terrible mortality that can entail.[13] It is therefore strongly urged that pentothal is the safest, speediest and most portable way of avoiding it. Woolmer [28] demonstrates its applicability and Jarman's pentothal case [13] proves it. One such case was in constant service on mobile unit work around London in the raids, and, compactly slung on the shoulder, made one entirely independent of other apparatus. Cyclopropane outfits can also be made sufficiently light and portable.

The protagonists of ether say that these methods are too dangerous for the non-specialist. Considerable experience with student assistants all through the crowded "Dunkirk time" has convinced me that any well-trained young medical man who may be called on for anæsthetics in this war can acquire sufficient skill, with a few weeks intensive training, in the methods outlined to be a much "safer" anæsthetist (having regard to the long view of mortality, not just the "get-'em-off-the-table-alive" outlook) than if left to struggle along with the older drugs and methods. Particularly if the specialist is not always available should his substitute be skilled in the use of drugs and methods least harmful to the patient.

No-one contemplating patients returned to the wards after surgery can fail to be impressed with the difference between the etherised and the non-etherised. The former often come back snoring, sweating and gurgling, with the relaxed hypotonic muscular system which results in poor circulating blood volume, reduced cardiac output and stagnant anoxia; after a long period of such coma they return to consciousness to vomit repeatedly and exhaustingly (further depleting their body fluids), and remain miserable for hours or possibly days. The latter usually return quiet, warm and dry; often fully conscious, with good tone in muscles and cardiovascular system, are rarely even nauseated and commonly taking fluids within the hour—not vomiting them. Which of these is more likely to have the greater comfort, the quicker convalescence; and (in the more serious cases) the better prognosis?

TABLE I—IMMEDIATE POSTOPERATIVE CONDITION IN 1000 CASES

Condition	Shortest time	Within 1 hr.	Longest time	Average time
Recovery of consciousness	Close of opn. (40%)	70%	7 hr.†	50 min.
Able to take fluids by mouth*	5 min.	50%	12 hr.†	2 hr.

* Excluding gut operations on special feeds.
† Including all severely shocked patients.

FIGURES IN 1000 CASES

Observations have been made on 1000 unselected cases of all types of general surgery, acute and "cold," in which *no volatile anæsthetic agent* was used. Some 220 of these cases were done with the American Hospital in Britain, and include many shock-producing procedures such as laminectomies, cup-arthroplasties of hip, and hip-joint excisions, often on poor-risk patients; 10% of these cases were transfused. The rest were done in EMS hospitals and include a fair proportion of severe casualties. The abdominal series includes acute emergencies as well as gastrectomies, splenectomies, &c. I doubt whether any methods employing volatile anæsthetics could show comparable results. An attempt was in fact made at the start of this study to run a parallel series of cases by colleagues using volatile anæsthetics. This however broke down owing to paucity of coöperation in completing cards by those using chloroform and ether.

TABLE II—POSTOPERATIVE PULMONARY COMPLICATIONS IN 1000 CASES

Normal respiratory tracts before operation (831 *cases*)

Complication	General cases (661)	Abdominal cases (170)	Total
Slight bronchitis ..	1 (0·15%)	2 (1·2%)	3 (0·36%)
Severe bronchitis ..	Nil	Nil	Nil
Pneumonia ..	1 (0·15%)	Nil	1 (0·12%)
Atelectasis	1 (0·15%)	1 (0·6%)	2 (0·24%)
Total morbidity..	3 (0·45%)	3 (1·8%)	6 (0·72%)

Pathological respiratory tracts before operation (169 *cases*)

Complication	General cases (112)			Abdominal cases (57)		
	No. of pts.	Worse	Further comp.	No. of pts.	Worse	Further comp.
Upper resp. infec.	52	Nil	Nil	20	2	Pneum.
Bronchitis ..	42	Nil	Nil	28	4	Nil
Asthma	2	Nil	Nil	2	1	Nil
Hypostasis ..	7	Nil	Nil	3	Nil	Nil
Tuberculosis ..	8	1	Hæmop.	3	Nil	Nil
Collapsed lobe; fluid	1	Nil	Nil	1	Nil	Nil

A further attempt to compare these modern non-volatile methods with modern methods of administering ether, by employing the latest ether apparatus, the Oxford Vaporiser, had to be abandoned after 18 cases at the generally expressed desire of the surgeons concerned, because the patients' postoperative condition became so much less favourable. This did not surprise one in view of the opinion recently stated by Bannister [30] that "a careful follow-up of cases . . . in the Radcliffe Infirmary, Oxford, has failed to show any difference between ether anæsthesia from the Oxford Vaporiser and ether anæsthesia by other means."

In the 773 general surgical cases the duration of operation ranged from 5 min. to 4½ hr., with an average of 48 min.; 308 were over ¾ hr. In the 227 abdominal cases duration ranged from 15 min. to 3 hr.; average 54 min.; 118 were over ¾ hr. As regards postoperative vomiting, including cases which had been vomiting before operation, only 20% of the patients had any

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TABLE III—COMPARATIVE TABLE OF TOTAL POSTOPERATIVE MORBIDITY AND MORTALITY

ABDOMINAL CASES			ALL TYPES OF CASE		
Complication	Gas-chloroform-ether series*	Modern anæsthesia series	Complication	Gas-chloroform-ether series*	Modern anæsthesia series
	%	%		%	%
Slight bronchitis	5·6	0·88	Slight bronchitis	5·9	0·3
Severe bronchitis	3·0	Nil	Severe bronchitis	2·5	Nil
Pneumonia	1·1	0·88	Pneumonia	0·99	0·3
Atelectasis	2·3	0·44	Atelectasis	1·39	0·2
Total pul. morbidity	12·0	2·20	Total pul. morbidity	11·9	0·8
Total pul. mortality	1·1	Nil	Total pul. mortality	0·7	Nil

* From tables published by Dawkins.[30]

There were two deaths within three days, both in moribund patients.

Male, aged 68. Fractured skull, ribs, clavicle, compound tibia; severe shock. Died, 24 hr. Cerebral compression, fractured base of skull at PM.

Male, aged 27. Right buttock, hip, thigh, leg, arm, completely pulped. Lacerated face. Profound shock. Died, 24 hr. Irreversible shock.

vomiting at all; of these 6% vomited once, 5% twice, 4% thrice and 5% more than thrice; 3·5% patients after spinals had moderate headache relieved by 'Veganin'; no true spinal headaches occurred. Of the 18 patients anæsthetised with the Oxford Vaporiser, 9 vomited, 3 once, 1 twice, 2 thrice and 3 more than thrice.

The immediate postoperative condition of the 1000 patients is summarised in table I. In the small Oxford Vaporiser series, where none of the patients was shocked or seriously ill before operation, the shortest time to recover consciousness was 15 min.; 6 of the 18 cases recovered within an hour; the longest time was 5 hr. and the average 2 hr. 7 min. One of these patients could take fluids by mouth after 30 min.; 3 within an hour; the longest time was 7½ hr. and the average 3 hr. 40 min.

The postoperative pulmonary complications are set out in table II, and the incidence is compared in table III with figures published by Dawkins from the Middlesex Hospital. In the 18 Oxford Vaporiser cases, though all had normal respiratory systems before operation, there was 1 case of slight bronchitis, 1 of interlobar empyema and 1 of bronchopneumonia.

SUMMARY

The patient's comfort and rapid convalescence, which should be the anæsthetist's major care after safety, have been largely neglected until lately. Many anæsthetists have thought that the only way to safety lies in adhering to the old and uncomfortable ways.

Chloroform and ether are the chief offenders against the patient's comfort, and it is unsound to judge their safety without following the patient's progress after leaving the theatre.

Chloroform has already been widely discarded because of its toxicity, and evidence is quoted to show that ether is so toxic and so liable to produce postoperative pulmonary complications that it should also be given up.

Nitrous oxide, pentothal and cyclopropane, combined with spinal or field blocks where deep relaxation is needed, can cover the whole field of surgery, including air-raid and front-line work.

Inexperienced anæsthetists can acquire sufficient skill to be much safer with these modern methods than if they use chloroform or ether.

In 1000 cases anæsthetised by modern non-volatile drugs the incidence of postoperative vomiting was only 20%, and the total postoperative pulmonary morbidity was 0·8%, compared with 11·9% in a comparable gas-chloroform-ether series.

I would like to thank my colleagues at the former American Hospital in Britain for their part in suggesting this study and their help in carrying it out; especially Dr. Charles Bradford of Boston, who mainly designed the follow-up card used.

(*References at foot of opposite column*)

LOBAR PNEUMONIA
TREATED WITH SULPHAMEZATHINE AND SULPHADIAZINE

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BECAUSE of the distressing toxic symptoms often seen in patients receiving sulphapyridine, other compounds of sulphanilamide, possessing the therapeutic activity of sulphapyridine but less liable to induce toxic side-effects, have been introduced. Both sulphathiazole and sulphadiazine have been found to be effective chemotherapeutic agents, and compare favourably with sulphapyridine as regards toxicity. Sulphathiazole, however, is not always free from emetic action, and sulphadiazine shares the tendency of other sulphanilamide derivatives to produce renal damage from precipitation in the renal tract (Thompson et al. 1941). This is due to the fact that, at physiological ranges of urinary pH, sulphadiazine is the least soluble of the sulphonamide compounds, although its acetyl derivative is much more so than the parent substance in an alkaline medium (Gilligan et al. 1943; Rose et al. 1943). To overcome this disadvantage, Rose and his colleagues, by introducing two methyl groups into the pyrimidine ring, prepared sulphamezathine (the 4:6-dimethylpyrimidine compound of sulphanilamide), and have reported on its chemistry and pharmacology. This substance and its acetyl derivative are approximately four times as soluble as the corresponding compounds of sulphadiazine. Sulphamezathine is rapidly absorbed from the intestinal tract, so that with regular dosage the concentration in the blood can be well maintained at 5–10 mg. per 100 c.cm. Preliminary clinical trials by Macartney and others (1942) suggested that it was of high therapeutic efficiency and low toxicity. Jennings and Patterson (1942) and Peters and Easby (1943) have also reported favourably on it.

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TABLE I—CASE-MORTALITY IN RELATION TO AGE

Age (yr.)	Sulphapyridine		Sulphadiazine		Sulphamezathine
	Cases	Deaths	Cases	Deaths	Cases (no deaths)
0– 9	2	.. ..	..	..	..
10–19	61	.. ..	16	..	12
20–29	78	5 (6·4%)	13	..	10
30–39	65	3 (4·6%)	9	..	15
40–49	55	10 (18%)	14	..	17
50–59	39	9 (23%)	7	..	7
60–69	37	9 (24·5%)	6	..	6
70–79	16	7 (43%)	3	1	1
80–89	1	1 (100%)	1	1	..

PRESENT INVESTIGATION

In this investigation an attempt was made to compare the efficacy and toxicity of sulphamezathine and sulphadiazine by treating in order of admission alternate cases of a series of 137 patients suffering from lobar pneumonia with either of the drugs, and to contrast the results obtained with 354 cases treated with sulphapyridine.

The diagnosis of lobar pneumonia was based on the history of the illness and physical examination, and on radiological examination carried out within twelve hours of admission and at weekly intervals thereafter. Before the beginning of treatment blood was obtained for culture and hæmatological examination, sputum was examined bacteriologically to confirm the predominance of pneumococci, and where possible the organism was typed. Only cases of true lobar pneumonia are included in this series. All cases of bronchopneumonia and atypical pneumonia, and cases showing a mixed flora on sputum examination, have been excluded.

The routine treatment in the case of all three drugs was essentially the same—administration of 4 g. of the drug, followed by 1 g. four-hourly. In the case of sulphamezathine and sulphadiazine the maximum total dose was 20–25 g. In the sulphapyridine cases a similar dosage was given, but a few cases received as much as 35 g. In addition to the usual symptomatic and nursing treatment, care was taken to ensure a large fluid intake.

In all cases radiological examination was carried out weekly, in an attempt to determine the time required for resolution of the pneumonic process, as judged by the disappearance of opacity in the lung. It was found that clinical recovery was seldom associated with a parallel disappearance of radiological signs, for the X-ray picture may be grossly abnormal two or more weeks after apparent recovery. In most cases however opacity in the lung fields had largely disappeared by 21 days, and persistence of lung shadows for a significantly longer period has therefore been regarded as evidence of delayed resolution. No account was taken of enlargement of hilar glands, which may persist for some time after the lungs have regained their translucency.

TABLE II—INCIDENCE OF TOXIC MANIFESTATIONS

Sp = Sulphapyridine; Sd = Sulphadiazine; Sm = Sulphamezathine

Drug	No. of cases	Agranulocytosis	Jaundice	Oliguria	Cyanosis	Vomiting	Headache or confusion	Rash	Fever
		No. & %	No. & %	No. & %	No. & %	No. & %	No. & %	No. & %	No. & %
Sp	354	1 (0·2)	3 (0·8)	5 (1·4)	14 (3·9)	129 (36)	23 (6·5)	9 (2·5)	2 (0·5)
Sd	69	..	..	1 (1·4)	1 (1·4)	1 (1·4)	..	1 (1·4)	1 (1·4)
Sm	68	..	..	..	1 (1·4)	..	1 (1·4)	1 (1·4)	1 (1·4)

RESULTS

The relation of age to case-mortality is set out in table I, the incidence of toxic effects in table II and the incidence of complications and sequelæ in table III.

Sulphadiazine.—Of 69 cases treated with this drug, 12 were suffering from some pre-existing general disease which might have been expected to affect adversely the outcome of the pneumonia. There were 2 deaths; 3 cases showed bacteræmia on blood-culture. The average time required for the temperature to become normal in the 67 cases which recovered was 35 hours; 2 cases failed to respond to treatment.

Sulphamezathine.—Of 68 cases treated with this substance, 5 were suffering from a pre-existing disease. There were no deaths in this series and no bacteræmic cases. The average time required for the temperature to reach normal was 43 hours; 1 case failed to respond to treatment. In 2 cases the pneumonic process recurred after initial recovery, and in both the condition responded rapidly to further treatment with sulphamezathine. Four cases showed toxic effects; there was no case of oliguria or hæmaturia, and no vomiting or nausea. One patient developed transient but well-marked cyanosis due to methæmoglobinæmia.

TABLE III—INCIDENCE OF COMPLICATIONS AND SEQUELÆ

—	Sulphapyridine (354 cases)	Sulphadiazine (69 cases)	Sulphamezathine (68 cases)
	No. & %	No. & %	No. & %
Failed to respond to treatment	13 (3·6)	2 (2·8)	1 (1·4)
Empyema	9 (2·5)	2 (2·8)	2 (2·9)
Recurrence of pneumonia	2 (0·5)	.. ..	2 (2·9)
Pleural effusion* ..	23 (6·4)	15 (21·5)	10 (14·8)
Delayed resolution ..	27 (7·6)	5 (7·2)	6 (8·7)

* Sufficient to produce well-marked clinical and radiological signs and to require aspiration.

Sulphapyridine.—The results obtained with sulphapyridine, in spite of the difference in total numbers, present some interesting comparisons with those obtained with the newer compounds. Of 354 cases, 310 recovered, giving a case-mortality of 12·4%. Twenty-five cases were suffering from pre-existing disease. Of the 44 fatal cases, 16 died either before treatment could be adequately instituted or from some pre-existing condition unrelated to the pneumonic process during convalescence, so that the corrected case-mortality is 7·9%. Twenty-one cases gave positive blood-cultures on admission, and one of these died. The average time required for the fever to subside was 29 hours.

DISCUSSION

As will be seen from the tables, there can be little doubt about the effectiveness of sulphamezathine in the treatment of lobar pneumonia. In the present series the death-rate was lower with sulphamezathine and sulphadiazine than with sulphapyridine. The difference in total numbers in the two series must be taken into account. It seems clear, however, that sulphamezathine is at least as effective as sulphadiazine and sulphapyridine. There was no very marked difference in the incidence of sequelæ, such as empyema and delayed resolution, between the cases treated with the three drugs, except that the incidence of pleural effusion is higher in cases receiving sulphamezathine and sulphadiazine.

Toxic effects from sulphapyridine are of course common, but they are rare with sulphamezathine and sulphadiazine. Of particular interest is the absence of gastro-intestinal symptoms and oliguria where sulphamezathine is used.

One of the cases treated with sulphamezathine showed well-marked cyanosis, due to methæmoglobinæmia. This is not surprising, because with careful spectroscopic examination of the blood it was found that methæmoglobin could be detected in many of the cases treated

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with sulphamezathine or sulphadiazine, although the degree of the methæmoglobinæmia was not sufficient to produce clinically remarkable cyanosis. Further, if either of these substances is administered along with confection of sulphur, sulphæmoglobin will be formed; so that, while the tendency of sulphamezathine and sulphadiazine to alter hæmoglobin is less than that of sulphapyridine, it is not entirely absent.

Two additional points of general clinical interest emerged. It was noted that in cases which recovered from pneumonia to develop empyema later, defervescence was slow; the average time for the fever to subside in such cases was 60 hours. As already stated, the radiographic signs of the lung lesion outlast the other clinical signs of pneumonia by some 1 or 2 weeks, and, in seeking for factors which might be correlated with the time of resolution, it was found that this had no relation to the duration of illness before treatment, the extent of the lung lesion, the apparent severity of the illness, or the total dose of chemotherapeutic agent employed. The incidence of this complication does however bear some relation to the age of the patient. Of 38 patients in which the pneumonia resolved slowly, 27 were over the age of 40.

SUMMARY

The results obtained by treating alternate members of a series of 137 cases of lobar pneumonia with sulphamezathine and sulphadiazine are compared with those in 354 cases treated seriatim with sulphapyridine.

The curative effect of sulphamezathine, as judged by case-mortality, is at least equal to that of sulphadiazine, and both drugs compare favourably with sulphapyridine.

In cases treated with sulphamezathine and sulphadiazine, the time required for the temperature to return to normal after the beginning of treatment is about the same, but is longer than in cases treated with sulphapyridine.

The incidence of toxic effects in cases treated with sulphamezathine and sulphadiazine was low—6% with sulphamezathine and 7% with sulphadiazine, as against 52% with sulphapyridine. Oliguria and gastro-intestinal disturbance were not seen in the cases treated with sulphamezathine.

In the incidence of sequelæ, there is little difference between these three drugs, except that with sulphadiazine and sulphamezathine pleural effusion during convalescence has been more frequent.

Delayed resolution is commonest in patients over 40, and a long period of defervescence is often followed by empyema.

We wish to thank Dr. H. J. Rae, medical officer of health for Aberdeen and Aberdeenshire, for permission to publish these cases.

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Medical Societies

SOCIETY OF MEDICAL OFFICERS OF HEALTH

AT a meeting of the Fever Group on Nov. 19, with Dr. ANDREW TOPPING in the chair, a discussion on

Hæmatology in the Infectious Diseases

was opened by Dr. G. W. GOODHART (LCC Pathological Service), who said that one of the difficulties in employing blood-counts in differential diagnosis is that the picture varies with the stage of the disease and this is often difficult to determine exactly. The prodromal stage of most fevers is characterised by a polymorph leucocytosis which persists into the eruptive stage in coccal diseases, whereas bacillary and viral infections tend at that stage to produce a leucopenia or a lymphocytic response. In scarlet fever a polymorph leucocytosis persists usually until the end of the second week and its absence in severe toxic cases is a bad prognostic sign. Eosinophilia, sometimes up to 10%, is characteristic. He would be chary of excluding scarlet fever even if there is no clear polymorph response. Prominent among the diseases marked by leucopenia with a relative lymphocytosis is enteric fever. These changes occur quite early but their importance in diagnosis is overshadowed by the development of modern bacteriological methods. Nevertheless, leucopenia is a valuable adjunct to diagnosis particularly in clinically atypical cases, while a blood-count can sometimes negative a diagnosis of typhoid which seems clinically probable but lacks bacteriological proof. Insufficient attention is paid nowadays to the characteristic absence of eosinophil cells in the leucopenia of typhoid fever. Leucopenia is not so constant in paratyphoid fever, and Dr. Goodhart has seen several mild cases in which there was a persistent polymorph leucocytosis. The blood-pictures in measles and rubella are roughly the same. With the appearance of the rash there is leucopenia with a relative lymphocytosis which often becomes an absolute lymphocytosis with a rising lymphocyte count. In rubella, plasma or Türck cells often appear in exceptional numbers They will be more helpful in differentiating rubella from scarlet fever than from measles since they are sometimes increased in measles also. Leucopenia with relative increase in lymphocytes occurs in mumps and could be used in differential diagnosis from septic adenitis where there is a polymorph response. It also helps to prevent confusion with glandular fever, though the rarer forms of this disease do show a leucopenia, distinguishable from mumps by the presence of atypical monocytes in stained films. Whooping-cough differs from other infectious diseases in raising the total white-cell count by increasing the lymphocytes. This change is found in the catarrhal stage before the whoop develops and may help the doctor to isolate contacts early. Lymphocytosis reaches its peak in the paroxysmal stage. Care is necessary in interpreting counts, particularly in the lower ranges, since the lymphatic apparatus in childhood can readily be stimulated by various pathological processes. Dr. Goodhart would put no great stress on figures below 20,000 per c.mm. except perhaps in adults and older children; even then he demands a high lymphocyte percentage unless the clinical picture is very suggestive. Exceptionally high total counts with comparatively few lymphocytes are not uncommon when complications arise. In a recent case of whooping-cough pneumonia there were 165,000 leucocytes per c.mm. of which 46·5% were polymorphs and only 42% lymphocytes. He felt it was unwise to talk too glibly of characteristic blood-counts in various fevers since many cases run a complete course without a greater change in the blood-picture than can be paralleled in healthy people. In convalescence anæmia should be estimated by blood-counts rather than on clinical appearances, which may often mislead in children. The blood-picture in the common infectious diseases needs further investigation, but the knowledge to be gained from a count should be weighed against possible emotional trauma in small children. Facilities for these and other investigations are deficient in most fever hospitals at present but there will doubtless be improvement in the future. It is a delusion to assume that anyone can do a blood-count: accurate results demand a technique only acquired by careful training, attention to detail and constant practice.

Dr. IAN TAYLOR (LCC) pointed out the difficulty of interpreting minor changes in the blood-count in children in the absence of exact standards of normality for the various age-group.—Dr. R. F. L. HEWLETT (LCC) had noted that in enteric fever with a respiratory onset there is sometimes a polymorph leucocytosis rather than a leucopenia, and other speakers agreed with Dr. Goodhart that leucocytosis is more likely to be met in paratyphoid than in typhoid.—Dr. A. L. K. RANKIN (Twickenham) felt that routine blood investigation in atypical throat infections would often uncover conditions such as the anginose type of glandular fever.—Dr. ROBERT CRUICKSHANK (LCC) supported this but pointed out that, since many of these cases have received antitoxin, a positive Paul-Bunnell reaction could not be accepted without further investigation. He wondered what is the signific-

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ance of eosinophilia in scarlet fever and whether it can be correlated with the allergic concept of scarlatinal nephritis. He had found a leucopenia with monocytosis in a number of typhus cases and thought this blood-picture might prove useful for early diagnosis.—Dr. A. B. ROSHER (LCC) described an investigation of 25 children, average age 9 years, suffering from acute catarrhal jaundice where the dominant picture was neutropenia.

SULPHONAMIDES

Dr. B. BARLING (LCC) said that cyanosis during sulphonamide therapy is commoner with sulphanilamide than with the later preparations. It can be cured in 15–30 minutes by intravenous administration of 10 c.cm. of a 1% solution of methylene-blue, or in 3–4 hours by giving methylene-blue by mouth. Thionin stain can be used in the same way. Cyanosis cannot invariably be demonstrated as due to methæmoglobin or sulphæmoglobin and many interesting explanations have been offered, but the complication is clinically of no great moment. A minor degree of anæmia is common during sulphonamide therapy but is more often due to the disease than the drug. Nevertheless, patients in the convalescent stage of disease after sulphonamide therapy often benefit from iron. Acute hæmolytic anæmia is a rare but dangerous complication of sulphonamide therapy. Symptoms are startling in their gravity and speed of onset. In one child he had observed the hæmoglobin fall from 90% to 30% in less than 36 hours, and red cells may be reduced to 2 million or less in an equal time. Treatment is to stop the drug, encourage free excretion by liberal fluids with alkalis and—once it is established that the kidneys are functioning well—to give blood-transfusions of the correct group and Rh factor, remembering that a pint of blood raises the hæmoglobin by about 9% in an adult male and over twice that amount in children. He gives double-strength blood whenever large transfusions are required and further transfusions may be necessary, because hæmolysis continues sometimes after the drug has been stopped. Aplastic anæmia is fortunately a rare complication; rapidly progressive anæmia with purpura and exhaustion is accompanied by reduction in red cells, white cells and platelets in the circulation and bone-marrow. The prognosis is invariably grave, but rapid elimination of the drug, repeated transfusions and 'Pentnucleotide' offer the best prospect of recovery. Thrombocytopenia had been recorded in America in only 12 cases during sulphonamide therapy, whereas about 15,000,000 people in that country are estimated to have been treated already with sulphonamides. Serious reduction in platelets can be caused by other drugs, and is a well-known complication of the chronic 'Sedormid' habit. Short of these rare cases some reduction in platelets usually occurs during sulphonamide treatment, and there may also be a slight fall in leucocytes. Agranulocytosis rarely appears until comparatively large doses of the drug have been consumed over a long period; it has been recorded after all the common sulphonamides including, surprisingly, sulphasuxidine. Agranulocytosis is perhaps the commonest of the rarer blood changes during sulphonamide therapy and about half the patients developing it die. Dr. Barling agreed with other speakers that though pentnucleotide should be given its effects are doubtful. Vitamin K is synthesised by the intestinal flora, and since this is disturbed or inhibited by sulphaguanidine some lengthening of clotting-time might be expected, and has in fact been observed in animals, during the use of the drug. At the same time their growth is slowed. By giving *p*-aminobenzoic acid or liver extract clotting-time and rate of growth are restored, while vitamin K corrects the hypoprothrombinæmia but not the growth-rate. In view of this work it has been suggested that vitamin K or liver extract should be given during sulphaguanidine and perhaps sulphasuxidine therapy to lessen the risk of hypoprothrombinæmia.

Dr. WILLIAM GUNN (LCC) said that nicotinic acid as well as pentnucleotide is of rather doubtful benefit in agranulocytosis. He felt that repeated blood-transfusion is the most hopeful treatment.—Dr. W. H. KELLEHER (LCC) described a child of one year who had been given a total of 70 g. of sulphaguanidine (15 g. daily) without any toxic effects.—Dr. E. N. ALLOTT (LCC) held that sulphasuxidine may be more readily absorbed than is usually thought, since blood sulphathiazole levels of 5–6 mg. per 100 c.cm. have been noted after its use. Similarly in some cases over 50% of sulphaguanidine has been found excreted in the urine.

Reviews of Books

Genetics of the Mouse

HANS GRÜNEBERG, Dr phil, Dr med, Moseley research student, Royal Society. (Cambridge Univ. Press. Pp. 412. 30*s*.)

GENETICALLY the mouse is so far the best-investigated mammal; and since inherited defects of many kinds are relatively common among mice, they present unequalled opportunity for study. The final developmental results are often very complicated, whereas what went wrong with the gene initially was very simple. It is not easy to work back from the wreckage of a complicated piece of mechanism to the spanner which was thrown into it. Much has been accomplished by using the convenient mouse, however, and a clear account of discoveries in this field is given in Dr. Grüneberg's book. Mouse genetics has contributed not only to the understanding of human genetics but to the study of inherited resistance to infectious diseases. Many of the experimental results are difficult to interpret, but Dr. Grüneberg, steering a careful course between too ready an acceptance of results and undue rigidity and scepticism, presents a good summary, writing with authority on a subject to which he has himself made important contributions.

A Short Practice of Surgery

(6th ed.) HAMILTON BAILEY, FRCS; R. J. MCNEILL LOVE, MS LOND, FRCS. (Lewis. Pp. 1084. 36*s*.)

THE sixth edition of this popular textbook of surgery has been thoroughly revised throughout and enriched with over forty new illustrations. Many of these are in colour. As a brief account of surgery the book leaves little to be desired. Its popularity largely depends on the authors' gift of summarising knowledge in few words, so that the maximum number of facts are presented in small space. In addition to this tabulation, illustrations and general layout are so attractive that a student is led on to read without realising how large a tract of knowledge he is covering. The task of the medical student is onerous, and a book of this kind is a great boon even though it does not pretend to give more than an outline of surgery. The groundwork can easily be supplemented from lectures, clinical demonstrations and reference to larger works—and it must be so reinforced if the student is to gain a sound knowledge of the subject. With this reservation the book can be warmly recommended.

Denture Base Readjustment

H. HIRSEKORN, DMD. (Wright. Pp. 122. 10*s*. 6*d*.)

To the younger generation of dental surgeons with their restricted training in dental prosthetics this little book will prove useful; but the older practitioners will find little which was not published and practised forty years ago. The author points out that badly fitting dentures may be a cause of ill health, for not only is the food improperly masticated, but the continuous irritation of a badly fitting plate over a long period may occasionally engender a malignant growth. Hypertrophy of the mucoperiosteum, and formation of a fibrous epulis are fairly common; and ill-fitting dentures are often associated with leukoplakia and lichen planus. It is less generally recognised that a badly fitting denture may be a focus of infection keeping the palate in a state of chronic inflammation; sometimes a mass of suppurating granulation tissue is present, particularly where a rubber suction disc has been worn. The micro-organisms present in this mass—generally staphylococci—may be driven into the blood-stream by alternating suction and pressure during mastication. The author's technique to remedy these defects is lucidly described and the illustrations and bibliography are good.

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THE LANCET

LONDON: SATURDAY, DECEMBER 11, 1943

A NEW BEGINNING

"THE last war," someone has said, "was like a surgical operation. This one is more like having a baby; it's not so bad, because there'll be something to show for it." This faith or optimism, so widely shared, will be refreshed by the plans adopted by the United Nations at Atlantic City last week. In UNRRA (the United Nations Relief and Rehabilitation Administration) they have conceived an international body that could exercise great constructive force. Technically its powers may be small compared with the need; but it will be strengthened by the goodwill of all who understand that neither patriotism nor victory is enough and that "after the war the peoples of this world will either go forward on the road to progress together or they will go to economic ruin together." [1]

This is for the future. Meanwhile we are concerned, like UNRRA, with practical projects, and especially with medical relief. The medical representatives of 43 nations [2] agreed at the conference that a new Health Organisation should be set up to help governments in the rapid re-establishment of their health services. One of its aims will be to share out responsibilities and resources in proportion to need and according to a coördinated plan. It will therefore require precise information about the assets and liabilities of every country, both in material and in personnel. CRABTREE [3] puts the three first problems in order of urgency as (1) starvation, (2) epidemics, and (3) maternity and infancy. The nature and adequacy of food will be one of the chief concerns of the Health Organisation, aided probably by regional commissions of experts on nutrition who will advise on changes in rations and priorities of rationing in their regions. An epidemiological section will collate reports, negotiate agreements on quarantine, and provide men and material for combating epidemics. The particular claims of children and expectant and nursing mothers will also need early attention: "prompt and adequate provision for the health and nutrition of these vulnerable groups is essential to the restoration of normal family life and community stability." Unfortunately there are many for whom normal family life can never return or must be long delayed—the orphans, the lost, and the vast populations displaced from their homes. The number who will want repatriation after the war is conservatively put at 16 millions.[4] These and other problems are so big that the governments of war-stricken countries will seldom be able to tackle them unaided. Indeed it will sometimes be necessary for the Health Organisation to take over temporarily the health administration of areas where services have broken down. But this is to be a last resort. Wherever possible, governments will be expected to assume full responsibility for health within their borders, and the national and local services will be the channel through which relief will flow. "Rehabilitation is not merely helping people. It is better than that. It is helping people to help themselves." [1]

The director-general of UNRRA is Mr. LEHMAN, formerly governor of New York state. He is the chairman (without a vote) of a central committee at Washington consisting of representatives of the United States, the USSR, China and Great Britain. This executive, whose decisions must be unanimous, is responsible to a council, comprising representatives of all the member nations, which meets twice a year and acts on a majority verdict. The doctors at Atlantic City rightly pointed out that, as almost the whole of UNRRA's activities have medical bearings, the director of the Health Organisation must hold a position enabling him, under the authority of the director-general, to develop policies and exercise technical direction over all health aspects of the work. The Health Organisation they proposed will have (1) a director of health with a technical and administrative staff, (2) a standing health committee to advise the council, the central committee, and the director, and (3) strong regional organisations, in areas such as Europe and the Far East, with regional health directors. It is hoped that the various member states will second officers of their health services who have the necessary competence coupled with ability to serve in an international team. "Members of the staff required to work away from headquarters . . . must be able to understand the outlook of the people among whom they are called upon to work. In comparison with this qualification, a knowledge of languages, though a valuable asset, is of secondary importance." In view of possible demands for technical assistance in almost any branch of medical or sanitary science the Health Organisation will also collect information about individual experts, and expert teams, available for field missions; moreover it will have to create skilled personnel by training. The standing health committee is to have 9 to 15 members, including accredited representatives of the health services of their countries and the chairmen of the regional health subcommittees. The latter bodies will be similarly constituted. Expert commissions, on the other hand, will be formed of individuals chosen for their special knowledge; "there is no necessity to make any such commission even approximately representative of a number of countries, except in so far as this may be necessary in order to get a balanced representation of several schools of scientific thought." For purposes of consultation, the director of health may also be empowered to summon meetings of the directors of all the national health services. "A constant objective of the health programme should be to demonstrate the effectiveness and need for international collaboration in public health. In so doing it will facilitate the later development of a permanent world-wide health organisation." Needless to say, the collaboration of existing international bodies will be sought wherever they can help.

One of the first tasks of the director-general will be to consider the report just issued by the Inter-Allied

1. Staley, E. Address to Canadian Institute of Public Affairs. Issued by US Dept. of State, Aug. 24, 1943 (No. 353).
2. UNRRA Conference, Atlantic City. Subcommittee on Policies with respect to Health and Medical Care. Chairman, Dr. Thomas Parran (USA); vice-chairman, Dr. J. Hong Liu (China); rapporteur, Dr. Melville Mackenzie (Great Britain); secretary, Dr. James A. Crabtree (USA).
3. Crabtree, J. A. Address to American Hospital Association. Issued by US Dept. of State, Sept. 14, 1943 (No. 382).
4. Inter-Allied Committee on Post-War Requirements. (See Melville Mackenzie, Medical Relief in Europe, *Lancet*, 1943, i, 183). *Times*, Nov. 23, 1943, p. 4.

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Committee on Post-War Requirements over which Sir FREDERICK LEITH-ROSS presides.[4] This estimates that the occupied countries of Europe, apart from Russia, will need in the first six months of peace 45,855,000 tons of foodstuffs, raw materials and other prime necessities—which will involve the use of 23,485,000 tons of shipping. Large as it may appear, this figure allows no more than 2000 calories a day per person; nor have the requirements of prisoners and displaced persons yet been worked out. It is clear that, as STALEY[1] puts it, "No relief and rehabilitation programme of the United Nations can promise anything like immediate restoration of prewar consumption standards in liberated areas. What it can and must do is to assure peoples in dire distress that, subject only to the limitation of available supplies and transport, their most urgent needs will be met immediately and that ways will be found under all circumstances to help them maintain a level of subsistence which, while not comfortable or even adequate by most peace-time standards, will at least preserve life and health and give them a base from which to start an advance toward better living." The UNRRA agreement has been well termed a Declaration of Interdependence.[5] Into the fulfilment of this declaration medicine must throw its weight effectively; and the new Health Organisation should give it a chance to do so.

COMFORT IN ANÆSTHESIA

How much of the misery that some patients experience after operation is due to the anæsthetic and how much to the operation itself is difficult to decide. For any discomfort that follows minor procedures not associated with after-pain it is fair to blame the anæsthetic entirely. After major operations it is harder to apportion the responsibility. Some discomforts are inevitable after certain operations, others may arise from or be increased by imperfect surgical technique. Thus unnatural postures may hamper free respiration, or put muscular and ligamentous structures under strain. Long exposure and loss of blood sap the patient's vitality. Trauma, heavy retraction, and the extensive use of abdominal packing are likely to be followed by shock, vomiting and intestinal distension. Further, trauma and rough handling cause tissue damage, and by increasing postoperative pain necessitate the longer and freer use of opiates which substitutes for pain the well-known discomforts of these drugs—depression, parched mouth, nausea or vomiting, and intestinal stasis. The repeated use of sedatives, especially when associated with shallow breathing on account of pain, also favours the development of pulmonary complications with their distressing consequences to the patient recovering from an abdominal section—a cough after gastroenterostomy feels as if a mule with a red hot shoe had kicked one smartly in the wame.

The patient's comfort, however, can in large measure be influenced for good or ill by his anæsthetist. Over-elaboration of the anæsthetic technique is not essential, and it must not be forgotten that the patient comes into hospital primarily for an operation and only incidentally for an anæsthetic. Yet dread of the anæsthetic—maybe from an unpleasant previous experience or from horror of losing consciousness at all—often far outweighs anxiety about the operation itself. Too few anæsthetists can see their hospital patients beforehand. The mere ordering over the telephone of heavy preoperative sedation is unlikely to set the patients' mind at rest. Fear of the unknown plays a large part in their uneasiness. All one patient may need is an explanation of the procedure and what he will be required to do. Another, like the patient depicted by a peripatetic correspondent in this issue, may want to be reassured that his heart is strong enough to stand an anæsthetic. Another may be relieved to know that he can, if he wishes, remain awake during the operation. Others may dread suffocation and hate the idea of anything being put over their faces, or may dislike pricks with a needle or rectal injections. The amount of preoperative sedation and subsequent anæsthetic required may be considerably reduced by giving the patient tranquillity of mind and inspiring him with confidence in his anæsthetist. And as H. P. CRAMPTON[1] has aptly remarked, "personality is non-toxic and does not throw any strain on the heart, liver or kidneys, nor does it depress respiration." Even today premedication is too often prescribed in a routine way without studying the requirements of each patient, so that it is too depressant for one patient and of little comfort to another. The dose should be graded for each patient. Hearing is abnormally acute in the semiconscious state and a quiet darkened room to himself will help the patient to become drowsy or drop off to sleep, but this ideal is difficult to attain in a busy hospital. Excessive drying of the mouth and throat is to be avoided; after his injection the patient should be permitted to rinse out his mouth, and if he sips a little water it will seldom do harm. Most patients appreciate some form of basal hypnosis by which they fall asleep in their beds and only reawaken when they are back in bed with the operation done. In the interval constant expert attention is essential if safety is not to be sacrificed to comfort, and even then it will be risky to give basal hypnotics to every patient. During his preoperative examination, besides getting to know his patient and prescribing premedication, the anæsthetist should satisfy himself that the patient is fit and properly prepared for the operation. If he thinks otherwise he should straightway tell the surgeon—a cold increases the risk of chest complications and should lead to the postponement of all but emergency operations. A patient about to undergo an abdominal operation or herniorrhaphy should be impressed with the importance of deep breathing afterwards, and if this has not been done already the anæsthetist should instruct him in suitable breathing exercises.

During induction and maintenance of anæsthesia care must be taken to avoid asphyxia and oxygen-want since they are likely to give rise to sickness, if nothing worse. As light an anæsthesia as is compatible with the smooth conduct of the particular operation is to be aimed at, but it is no service to the patient if the surgeon's work is hampered by incomplete anæsthesia; the surgeon at work inside the abdomen will take longer over the operation and be forced to use heavy retraction and much gauze packing. The importance attached to the choice of anæsthetic

5. Neilson, W. A. and Swing, R. Gram, What the United Nations Relief Agreement Means to You. Food for Freedom, Inc., Washington DC.

1. *Proc. R. Soc. Med.* 1934, 28, 94.

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agent in determining the patient's postoperative comfort might often be better applied to the skill with which the particular drug was administered. The perfect all-purpose anæsthetic agent has yet to be discovered; all have their disadvantages and limitations. The patient's safety and comfort will best be served by a wise discrimination in their choice and combination to suit the particular case. That anæsthetist will serve his patient best who is capable of using all agents and methods—new as well as old—to the best advantage, taking into account, as MALLINSON urges on another page, postoperative results as well as the patient's reactions in the theatre. The keeping of complete records is an admirable practice for bringing home to the individual anæsthetist how his patients have been faring from month to month, but even when working in similar circumstances an anæsthetist cannot safely deduce that the techniques with which he obtains the best results would necessarily bear similar fruit in the hands of others. Conditions of work, standards of satisfaction, and criteria for the assessment of postoperative complications are also such individual matters that comparative deductions are apt to be misleading unless made by an unbiased observer.

PENICILLIN IN THE FIELD

WHEN Professor FLOREY and his Army colleagues went out to North Africa early this summer their aim was first to decide whether penicillin could be used effectively in the field at all, and secondly to determine how and at what stage the small supplies available could be used to the best advantage. Much had already been learnt of the mode of action and dosage of penicillin from the work of FLOREY and his colleagues in civilians, and PULVERTAFT [1] and others had been working with limited quantities of the substance for a year in Egypt. But it had yet to be decided whether to concentrate efforts on wounds in which infection had got a hold, or, so far as supplies would allow, to treat all casualties from the start in an endeavour to avoid serious sepsis. It was shown in a series of septic wounds treated at Algiers that while local applications of penicillin cleared up infection of 3–16 weeks standing in flesh-wounds when various other methods had failed, the results were poor where bone was already severely infected, and the expenditure of penicillin per case was large. Clearly if a choice had to be made the saving of manpower would be greatest if the larger flesh-wounds and compound fractures could be so treated as to prevent infection and justify early suture, with consequent quicker return to duty. British surgeons were advocating early closure of wounds in 1917. Those less than 12 hours old were to be closed by primary suture, if the patient could be retained at the CCS for 7 days. Selected wounds 2–5 days old were closed at base hospitals in France by "delayed primary suture," provided they were free from suppuration and any clinical evidence of infection, and provided preliminary bacteriological examination of smears from the wound showed few or no bacteria. Complete or partial success was claimed in about 75% of cases, but these were not followed for many days. In view of the difficulty of retaining cases, the lack of effective antibacterial substances at that time, and the imperfect understanding of secondary streptococcal infection, it is not surprising that delayed primary suture was not generally adopted. In the present war no-one knows how many delayed primary sutures or secondary sutures have been performed at an early stage with success; the number does not seem to be large. This again is not surprising, for even with sulphonamide medication sepsis is common, and in the forward areas suturing is out of favour owing to the catastrophes which have followed it. But penicillin has entirely changed the picture; here at last is a non-toxic agent, which, even in the presence of pus, will eliminate gram-positive organisms from any infected surface with which it can be brought into contact in an adequate concentration. Thus for the first time suturing of a gunshot wound could be embarked on without the fear of dangerous spread of infection to the blood-stream.

In the present investigation, the preliminary report of which is summarised on another page, there was no intention to close wounds at the CCS, but the aim was to close all flesh-wounds at the forward base, whether they were less or more than 12 hours old. The success reported by FLOREY and CAIRNS and the Army surgeons who worked under their general direction has realised the hopes that civilian experience raised. Thus among 171 soft-tissue wounds closed early at Tripoli and Sousse—most of them 3–12 days old—only 7 had to be reported as failures, and these occurred early in the investigation before the technique had been fully worked out. Wounds closed after excision and local treatment with penicillin are strikingly free from reaction. After 8–12 days they may be found bathed in pink or green gram-negative pus, but when this is wiped away the wounds are seen to be clean, and free from œdema or redness. The experienced war surgeons who shared in the investigation agreed that in this series the duration of wound healing was reduced by 3–6 weeks; in a larger series the saving in hospital time, dressings, equipment and transport services would be considerable. The nursing of these patients is easier than when the wounds are left open, and the patient is spared the stink of the plaster casing or the pain of frequent dressings. Fibrosis in and around the wound is reduced, with improvement in function of the injured part. The possibility of hospital streptococcal infection and of such complications as cellulitis, lymphangitis and erysipelas is avoided, and the rapid removal of pyogenic cocci from deep wounds probably diminishes the risk of secondary hæmorrhage.

The success of penicillin in the treatment of compound fractures was encouraging though not so strikingly as in the soft-tissue wounds. Here the drug was usually given parenterally, it being thought on theoretical grounds that local application would not ensure the drug reaching all parts of the fracture. Among 36 fractures there were only 5 complete failures, and here again they occurred early in the series, but there were many only partial successes. It was thought that too much was attempted in the way of wound closure, and that for a comminuted fracture it would be wise to leave potential drainage to the exterior for 7–10 days; the dosage of penicillin was thought to be too low in the cases of comminuted fracture of the femur. But

1. Pulvertaft, R. J. V. *Lancet*, Sept. 18, 1943, p. 341.

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results were particularly successful in the few cases where penicillin treatment was begun at the CCS level, and it seemed likely that when penicillin can be administered in the forward area no fracture will require more than a five-day course of 500,000 units at the base. The report emphasises that the forward administration of penicillin should never be taken as encouragement to do a wound suture at the CCS level; the wound must be left open until the patient can be retained in hospital and full penicillin treatment begun.

It is in the large soft-tissue wound and the compound fracture that penicillin may lead to the greatest revolution in treatment (and prognosis), but other triumphs are recorded in the report. Thus the 7 cases of gas-gangrene treated, though 3 of them died, demonstrated that penicillin in adequate dosage is effective in *Cl. welchii* infection, and the experience with head-wounds suggests that penicillin deserves a trial in brain-wounds for which definitive treatment cannot be obtained before 72 hours—a type of case which may become all too common if fighting fronts advance and fan out rapidly. A two-day course of sodium penicillin cured 9 cases of gonorrhœa which had failed to respond to sulphonamides, and a fresh case was cured by nine 4-hourly doses, totalling 135,000 units, confirming American reports[2]; if enough penicillin was available this treatment could be carried out in forward areas with 2 days' absence from duty. Finally, there was a small series of burns, and the satisfying experience is amply supported by BODENHAM'S larger series reported in this issue. The Mediterranean report does not suggest that penicillin should be a routine treatment for burns, for which the sulphonamides usually give equally good results, but it plays an important rôle when a hæmolytic streptococcal infection of a granulating area has persisted in spite of local sulphonamide therapy and is preventing free grafting and normal healing. The common organisms insensitive to penicillin—*B. pyocyaneus* and *B. proteus*—form quantities of pus which may float skin-grafts away, but in most cases a graft will take despite the gram-negative infection. In BODENHAM'S series a cream applied every 24 hours gave the best results, but a frosting of penicillin-sulphanilamide powder, spread under a graft on a non-infected surface, was useful as a prophylactic, and should prove valuable in the immediate grafting of superficial wounds.

So penicillin can make a substantial contribution to the health of wounded soldiers; its possibilities in those who are sick have yet to be explored. If enough were available—a phrase inseparable from any discussion of penicillin—for application to every wound in the forward area, sepsis as we know it might almost disappear. Meanwhile, the report urges strict control of supplies, with concentration in one theatre of operations, and gives no encouragement to the supporters of crude penicillin. Much publicity has lately been given to an American technique[3] of growing the penicillium on gauze and using this as a dressing, but the report tells a tale of some material labelled 'Penicillin' which proved inactive, and says emphatically: "In no circumstances should unassayed penicillin be used."

2. See *Lancet*, Oct. 30, 1943, p. 546.
3. Robinson, G. H. and Wallace, J. E. *Science*, Oct. 8, 1943, p. 327.

Annotations

HEAD INJURIES IN CHILDREN

THE elastic skull of childhood is popularly supposed to be more tolerant of clouting than the solider domes of the mature. The belief may be partly pragmatical, for to keep at rest a child who has had a mild concussion and now feels fine is a task for giants. Guttmann and Horder[1] have analysed the after-effects of head injury in 60 children under the age of 15 admitted consecutively to an accident department; an additional 6 cases, admitted earlier, were also included because of their severity. There were 45 boys and 21 girls in the series, suggesting that head injuries are to the adventurous. A group of 38 who were of school age showed a normal distribution of intelligence on testing, 7 being below average, 21 average and 10 above. There was no evidence of accident liability among them. Two-thirds of the injuries were due to road accidents. This runs counter to the experience of Wyllie,[2] who has suggested that in childhood the damage is usually done by a violent movement of the head against a fixed object. Of the 41 children injured in road accidents in Guttmann and Horder's series, 11 were passengers at the time. An analysis of the age-range of the rest injured in this way might show that the danger is chiefly to the runabout child; probably the moving-head type of injury predominates among infants and crawlers. Fractures were commoner in the series than among 165 adults admitted with head injuries (43% as against 27%). Neurological signs were present in nearly half the cases, and 5 of the consecutive 60 developed fits within an hour of the accident; of the 165 adults only one developed fits. The stage of clouded consciousness usually experienced by adult patients was replaced, or perhaps masked, among the children by a phase of emotional disturbance. Left to themselves they were usually quiet and apathetic in the early stages, but they resented conversation and physical examination and were irritable and morose; and they did not "respond to the usual little bribes." This phase usually ended suddenly, the child waking up one morning as his natural cheerful self. In the early stages headaches were rarer than among adults, but the incidence after discharge was about the same in the two groups. Three-quarters were discharged in less than 2 weeks; half of them were away from school for 2–7 weeks, a quarter being away for a longer time and a quarter for less. Late signs and symptoms of head injury are hard to assess because it is natural to attribute all later aberrations of health or conduct to "that knock he had on the head." Of the 66, 19 had nervous or mental after-effects which their relations put down to the head injury, and 6 developed the postconcussional syndrome of headache with or without giddiness. The writers point out that neurotic and emotional symptoms often have nothing to do with the injury: the history may provide evidence of similar behaviour before the accident; nevertheless they mention one or two cases in which changes in temper could fairly be put down to the blow. Only 2 cases showed serious disorders of conduct, and in one of these there was a previous history of delinquency; the other was a billeted child who got across his foster mother. Of 35 of the children followed up at school, intellectual performances remained as good as ever in 32; in 2 defectives it could not be accurately assessed. In only one, a boy with traumatic epilepsy, was mental deterioration serious. The opinion that children on the whole tolerate head injury well recover quickly, expressed last year at the Royal Society of Medicine,[2] is thus not fully borne out by the present study. Skull fractures are commoner, headache nearly as common as in adults, and other after-effects though

1. Guttmann, E. and Horder, H. *Arch. Dis. Childh.* September, 1943, p. 139.
2. Wyllie, W. G. *Lancet*, 1942, i, 170.

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uncommon are not wholly negligible. Guttmann and Horder, however, do not regard this as ground for keeping the child at rest for a long period; the cases in their series were treated with the same "active rehabilitation" as adult cases. They were not expected to lie flat unless they felt like it, and were encouraged to get up as soon as their general condition permitted.

THE VENOPRESSOR MECHANISM

IT has long been taken for granted that during muscular exercise the veins must be subjected to a pumping action by the muscles which, in virtue of the valves in the veins, are thus able to augment the inflow of blood to the right auricle. Yandell Henderson [1] goes further, and regards skeletal muscle tone as an essential part of the circulatory mechanism. Should it disappear entirely, there is plenty of room in the capillaries and venules released from its supporting pressure for a large volume of blood. More important, there would now be nothing to drive the blood from the veins, and the circulation would come to a standstill. This theory envisages a type of shock in which primary disturbances of vascular tone have no place, and which is said to be a well-marked feature of conditions of circulatory failure complicated by acapnia (loss of carbon dioxide). The skeletal muscles may well be of much greater importance from the circulatory point of view than we have hitherto imagined, and Henderson's views on the importance of estimating the venous inflow into the heart and his method for doing so are particularly interesting, but it is more than doubtful whether he is justified in going the whole hog. We know that apparently resting muscles are in fact always in a state of tone, or mild reflex contraction, but in order to make a pump out of this mechanism Henderson has to assume that the slight tension of a resting muscle is maintained not by the steady contraction of one group of fibres but by a rotation of groups, one taking over from another so that individually they alternately contract and relax. There is little or no evidence for this attractive idea, though it has gained wide acceptance. Denny-Brown [2] investigated it and concluded that the same groups of fibres maintained a steady contraction. It must be conceded that in a standing position a certain amount of swaying takes place, and this must inevitably transfer the tension in the muscles involved from one place to another. It must materially help the circulation, and we are ready to believe that without such slight movements man would not be able to support the erect posture for more than a short time without circulatory failure.[3] But man is not always erect, and Denny-Brown's findings dispose of the idea of an inevitable pumping action in resting muscle. It might still be tempting to postulate continual slight movements—though in anæsthesia, for instance, it would be difficult to believe in their presence—but in curare we have a drug which effectively paralyses all striped muscle and eliminates all possibility of movement and even of tone. In animals kept alive by artificial respiration, the circulation does not stop on curarisation. In 1878 Gaskell [4] actually recorded the blood-flow from the thigh muscles of several curarised dogs, and at least one of his records shows the arterial blood-pressure, which was over 100 mm. Hg. German investigators [5] have confirmed that intramuscular pressure is lowered in anoxia and acapnia, but say that it recovers immediately on breathing normal air. Nevertheless, Henderson's interpretation of altitude sickness—anoxia, overbreathing, acapnia, depression of spinal motor centres, loss of muscle tone, failure of venous return—deserves attention in view of the question of the advisability or otherwise of supplying carbon dioxide to airmen at high altitudes.[6]

To sum up, it is probably fair to say that the "venopressor mechanism" is an important factor in maintaining the circulation which should not be neglected in assessing the causes of circulatory failure. Its stimulation by carbon dioxide is likewise only one of the functions of this substance which should be taken into account when weighing its advantages and disadvantages. An excellent review of the various actions of carbon dioxide is given by Brazier,[7] who shows that in addition to its direct stimulation of the respiratory centre, and its well-known effect on the oxygen dissociation curve of the blood, it improves the circulation by sensitising the vasomotor centre, stimulating the carotid body and increasing muscle tone. Perhaps even more important is its direct dilator action on the cerebral blood-vessels, and Brazier poses the obvious question: in high-altitude flying, how far should arterial oxygen tension be sacrificed in order to gain the benefit of increased blood-flow through the brain? She rightly emphasises the importance of testing the efficacy of carbon dioxide by the actual performance of the individual, not by criteria such as arterial oxygen tension which, though apparently of high significance, may be misleading.

WINTER TOMATOES

As a source of vitamin C the tomato stands high among the components of an ordinary diet. Holmes, Jones and Ritchie [8] note that the ascorbic-acid content of field-grown, fully ripened, "vine matured," summer tomatoes has been estimated by several workers as 25 mg. per 100 g.; so that two large tomatoes a day would supply nearly the whole of the 75 mg. of ascorbic acid recommended by the American Medical Association. So much for the summer tomato, ripening on its native vine; but what of the winter tomato? Holmes and his colleagues found a much lower vitamin-C content in late winter tomatoes than in summer fruit. They bought their tomatoes retail from two chain and two independent stores during the months of February, March and April. The average ascorbic-acid content of these tomatoes was only 8·8 mg. per 100 g. The lowest value obtained was 2·5 mg. and the highest—a solitary finding far outstripping the rest—22 mg. Thus the vitamin-C value of the fruit was only about a third that of summer tomatoes; and since this all happened in America the observers could point to the orange as a much better and cheaper source of vitamin. They had, of course, no means of knowing how long their tomatoes had been picked. Olliver,[9] testing samples within a few hours of picking, found the ascorbic-acid content of tomatoes to be 22 mg. per 100 g., which accords well enough with the American findings for summer fruit. She finds that when leaf vegetables are stored, ascorbic acid is rapidly destroyed; and root vegetables also lose the vitamin, though more slowly, on storage: but in the case of fruits she finds that "no adjustment need be made for normal storage" which suggests that mere delay between picking and buying cannot be wholly responsible for the low vitamin content found by the American workers. In this country winter (or autumn) tomatoes are usually picked green, or when barely beginning to turn colour, and are ripened off the plant for a period ranging from a couple of days to a fortnight or more. They get a diminishing quantity of sunlight, and separated from the living plant have little encouragement to develop their full vitamin content, or even their full sweet summer flavour. Something depends, too, on the variety, since genetic differences affect vitamin-C content. Holmes and

1. Henderson, Y. *Medicine*, 1943, **22**, 223.
2. Denny-Brown, D. E. *Proc. roy. Soc.* 1929, **104B**, 252.
3. Hellebrandt, F. A., and Franseen, E. B. *Physiol. Rev.* 1943, **23**, 220.
4. Gaskell, W. H. *J. Physiol.* 1878, **1**, 262.
5. Schnell. *Luftfahrtmedizin*, 1942, **7**, 58 (from abstract).
6. *Lancet*, 1943, **i**, 780.
7. Brazier, M. A. *Medicine*, 1943, **22**, 205.
8. Holmes, A. D., Jones, C. P. and Ritchie, W. S. *New Engl. J. Med.* 1943, **229**, 461.
9. Olliver, M. *Chem. & Ind.* 1943, **62**, 146.

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his colleagues note that the late winter tomato of the shops is not even as rich in the vitamin as the canned or bottled tomato of the preceding summer. They quote work showing that the ascorbic-acid content of such canned and bottled fruit is about 15 mg. per 100 g.—almost two-thirds the summer figure.

YOHIMBINE AS AN APHRODISIAC

THE family of rubiaceæ has been a good companion to man. In this country, it gives us the elder of our hedgerows and the sweet smelling woodruff; in Europe, the madder which yielded alizarin and other priceless dyes; further afield, cinchona and ipecac. A more equivocal blessing is the *Pausinystalia yohimba* of the Cameroons and French Congo, from which is derived an alkaloid which has long had an under-the-counter reputation as an aphrodisiac. There was, however, little experimental evidence to warrant this belief, the erection that it produces in some animals being explained by the vasodilator action which is its most characteristic property. There may be some central action, but it is more likely that the results claimed in humans have been psychological rather than pharmacological. Recent developments in sex endocrinology have reawakened interest in the drug, and there have been claims and disclaimers of its œstrogenic action. For instance, Hechter, Lev and Soskin [1] used yohimbine in their efforts to assess the part played by hyperæmia in the effects of œstrogens on the reproductive organs; they found that one or more injections of 1 mg. caused uterine distension, proliferation of the uterine musculature and endometrial stroma, together with cornification of the vagina. These results obtained in castrated mice suggested that many of the effects commonly attributed to the specific effect of œstrogen were in fact due to hyperæmia, which is a constant concomitant of œstrogenic action. But D'Amour [2] had been unable to produce œstrus in castrated rats. A more extensive investigation has now been undertaken by Fugo and Gross.[3] They find that while 1 mg. of yohimbine given daily to immature female rats produces no precocious sexual development, doses of 1–4 mg. in intact adult female rats for 40–100 days give rather curious results. With the lower doses the normal œstrus cycle was altered by the appearance of prolonged periods of œstrus, lasting from 3–9 days, while with higher doses a condition resembling pseudopregnancy was produced. In spite of these results they were unable to obtain any vaginal cornification by similar treatment of adult castrated rats, showing that the œstrus produced in the intact rat was not due to hyperæmia and was presumably caused by some stimulation of the ovary. This latter possibility was in turn ruled out when hypophysectomised rats with intact ovaries were injected in the same manner. No œstrous conditions were produced. This placed the site of action of yohimbine one stage further back, and indicated the pituitary gland as the intermediary of the œstrogenic action. Fugo and Gross showed that this was so by experiments on adult male rats which had immature ovaries implanted into the anterior chambers of their eyes. Yohimbine injections in these rats, whether intact or castrated, led to the formation of corpora lutea in the transplanted immature ovaries. Fugo and Gross conclude that yohimbine stimulates the secretion of luteinising gonadotrophin from the pituitary gland. If these results are confirmed then here may lie the explanation of the aphrodisiac reputation of yohimbine. It will be interesting to see whether the stimulating action is confined to the gonadotrophic factor or whether the other pituitary principles are also stimulated.

1. Hechter, O., Lev. M. and Soskin, S. *Endocrinology*, 1940, **26**, 73.
2. D'Amour, F. E. *Ibid*, 1935, **18**, 235.
3. Fugo, N. W. and Gross, E. G. *Ibid*, 1942, **31**, 529.

MORE ABOUT THE NURSE'S PAY

A SECOND report of the Nurses Salaries Committee, chairman Lord Rushcliffe, has now appeared, proposing welcome changes in the rewards of a profession which until recently had altogether too much in common with virtue in that respect. The anomalies which honeycomb our nursing service, however, have imposed some of their pattern on the committee's decisions. Custom has always carried its full weight in this country, and custom must no doubt be thanked for the decision to make the pay of male nurses higher than that of women in the same grade. A proposal that the higher rates should be payable only to married men with families, and to women nurses who could show they had dependent relatives, would have been more daring and more just. Another decision governed by custom has been made in regard to the pay of health visitors and district nurses. In the proposed scale health visitors are to begin at £270 and rise to £360. A senior district nurse begins at £240 and rises to £300; to qualify for this salary, she must be a state-registered nurse, a state-certified midwife and must have successfully completed an approved course in district training (usually lasting 6 months); that means that she has been in training for close on 5½ years. A health visitor can train in one of two ways. She must either hold the SRN and the SCM certificates and have completed a 6-months course in public health work—in which case her training is exactly comparable with that of a fully trained district nurse except that she has taken a different course of specialised training. Or else she may take an SCM certificate (2 years), a public health course lasting 2 years, and 6-months training in a hospital—a total of 4½ years. Thus a properly qualified district nurse is at least as well trained as a health visitor. Moreover, some district nurses hold the health visitor's certificate, and these are said to be the most highly qualified women in public health nursing today. The Rushcliffe Committee recommend that where a local authority requires a district nurse to hold the HV qualification she should receive an additional £10 p.a. (bringing her maximum salary up to £310); and where she undertakes midwifery regularly she should receive a further £10 p.a. (maximum £320). Even these additions leave her £40 behind the health visitor; yet, speaking generally, the district nurse has the harder job, with more erratic hours and less leisure. It seems a pity to rate her services lower, especially now that her potential value as a public health teacher is beginning to be recognised. It must be borne in mind, however, that district nurses are apt to vary more widely in their qualifications than health visitors: at one end of the scale is the Queen's nurse, holding the qualifications already mentioned, at the other end the village nurse-midwife holding only the SCM. The committee have graded the scale downwards according to qualifications, and recommend that a statutory qualification should be prescribed for district nurses as soon as circumstances permit. They also propose a scale for state-registered nurses in nurseries, and in the main their recommendations seem a substantial advance on existing practice and level things up considerably.

THE Nuffield Provincial Hospitals Trust, at Lord Nuffield's suggestion, has offered the University of Oxford £8000 a year for ten years towards the cost of establishing and maintaining a plastic surgery unit. The university has accepted the offer and has appointed Mr. T. Pomfret Kilner as the first director of the unit with the title of Nuffield professor of plastic surgery. The Radcliffe Infirmary will provide hospital facilities for the unit, and these will be supplemented by the Ministry of Pensions.

Mr. REGINALD WATSON-JONES will speak on a surgeon's impressions of Soviet Russia at the annual general meeting of the Anglo-Soviet Medical Council, on Friday, Dec. 17, at 5.30 PM, at 1, Wimpole Street, London, W.1.

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Special Articles

INCAPACITATING SICKNESS AMONG MERCHANT SEAMEN

ALEXANDER HUTCHISON
M D GLASG, F R F P S, D P H
PORT BOARDING MEDICAL OFFICER, GLASGOW

UNDER a war-time agreement with the Shipping Federation, the port boarding medical officers of the Glasgow Port Health Authority attend cases of sickness among merchant seamen while their ships are in the Clyde anchorages emergency port.

During the two years from May, 1941, to May, 1943, these medical officers were called upon to deal with 5374 cases of sickness among Merchant Navy personnel while their ships were in the anchorage; these do not include cases of sickness found among the crews of ships on their arrival at the port. The incidence of

TABLE I

INCAPACITATING SICKNESS AMONG MERCHANT SEAMEN

Disease	1941–42		1942–43		Total	
	Cases	%	Cases	%	Cases	%
1. *Infectious disease*—						
Acute	162	9·1	296	8·2	458	8·5
Chronic	17	1·0	40	1·1	57	1·1
Venereal disease	165	9·3	377	10·5	542	10·1
Total	344	19·4	713	19·8	1057	19·7
2. *Trauma*—						
Accidents	291	16·4	566	15·7	857	15·9
Caused by physical agents	53	3·0	63	1·7	116	2·2
Total	344	19·4	629	17·4	973	18·1
3. *Systemic diseases*—						
Heart and blood-vessels	50	2·8	89	2·5	139	2·6
Respiratory system	178	10·1	254	7·0	432	8·0
Gastro-intestinal system	255	14·4	574	15·9	829	15·4
Genito-urinary system	17	1·0	42	1·2	59	1·1
Motor system	110	6·2	194	5·4	304	5·7
Nervous system	24	1·4	36	1·1	60	1·1
Tumours	7	0·4	23	0·6	30	0·6
Adenitis	1	0·1	25	0·7	26	0·5
Blood	4	0·2	9	0·2	13	0·2
Eye	31	1·8	65	1·8	96	1·8
Ear	31	1·8	76	2·1	107	2·0
Skin	271	15·3	556	15·4	827	15·4
Unspecified	103	5·8	319	8·9	422	7·9
Total	1082	61·3	2262	62·8	3344	62·2
Grand total	1770	100·0	3604	100·0	5374	100·0

disease among these cases is shown in an abridged form in table I. From the original table I have selected diseases which are chief contributors to incapacity among merchant seamen:

Disease	*Cases*	%
Infectious disease	515	9·6
Venereal disease	542	10·1
Trauma	973	18·1
Bronchitis	254	4·7
Defective teeth	230	4·3
Gastritis	267	5·0
Skin diseases	827	15·4
Scrimshanking	191	3·6

INFECTIOUS DISEASES

Infectious disease, including venereal disease, is responsible for 19·7% of all sickness. Of this figure 2·5% is due to tonsillitis and 3·3% to influenza. Influenza is a vague term, which includes feverish colds, malaria and even anxiety states. These diseases, tonsillitis and influenza, are spread by close contact with the patient, and in overcrowded forecastles the disease spreads rapidly. Tuberculosis is responsible for 1·1%, but it is difficult to estimate how many of these patients went to sea because of the mistaken idea that the sea air would benefit their tuberculosis.

The steps to control the spread of these respiratory infections include:—

1. Reduction of overcrowding in forecastles.
2. Increase of isolation accommodation on board ship.
3. Education of masters of the high infectivity of these diseases, especially tonsillitis and influenza.
4. Prevention, by strict medical examination, of any patient suffering from tuberculosis adopting the Merchant Navy as a career.

Venereal disease accounts for 10·1% of all incapacity among merchant seamen, and is being considered separately in view of its special nature. The figure is very high, and is known not to include all cases. Steps should be taken immediately to combat this disease. The measures to reduce its incidence would include:—

1. Examination before embarkation and disembarkation of all seamen, followed by intensive treatment ashore of all recognised cases—the treatment to conform to the recommendations drawn up by the Ministry of Health and circulated in November, 1942.
2. Closer coöperation between the medical officers of the Merchant Navy reserve pool and medical officers of the port health authority is essential, and is possible.
3. Closer inspection of all medical equipment carried on board.
4. Reconsideration, as an urgent measure, of the possibilities of prophylaxis as opposed to concentration on treatment after infection. This is a field of activity which has been explored with success in the Fighting Services, and it is to be hoped that the experience gained will be available for the benefit of the merchant seamen.

TRAUMA

Trauma accounts for 18·1% of all sickness. In any industry this would be a high figure, but it is likely that in the Merchant Navy it is higher during war than in peace for obvious reasons. Measures to reduce the incidence would include:—

1. If the ship is in port, and the dockside illuminated for the discharge of cargo, some lights should be available on board ship, especially at companionways and in alleyways. The glare from the quayside intensifies the darkness on board ship and accidents follow.
2. Decks and alleyways should be kept clear of obstacles and wet refuse.

SYSTEMIC DISEASES

Systemic diseases account for 62·8% of all incapacitating sickness. Of these, diseases of the respiratory system, the gastro-intestinal tract and the skin are the main contributors.

Bronchitis is chief among the respiratory diseases. The ætiology is vague. There are various types, some of which are related to: a respiratory infection; dusty atmospheres; extremes of heat and cold; or psychoneurotic components, which perpetuate symptoms and may even amount to the extent of a secretory neurosis of the bronchi.

Defective teeth and gastritis are chief contributors to the high incidence among the gastro-intestinal diseases. Defective teeth may cause gastritis, but gastritis is a vague term which covers a variety of stomach complaints due to a variety of causes. Modern medical opinion is more and more inclining to emphasise the important part played by the emotions in many of the cases of gastritis.

Half of the skin complaints are attributable to inflammatory conditions. Scabies is responsible for 5·5% of all sickness.

Many of the disease terms included under systemic diseases cover psychoneurotic and psychosomatic states, but their number is difficult to estimate. I have hesitated to use the word scrimshanking in an article dealing with merchant seamen, but this is the only term I can find to describe the type of complaint affected by some in their desire to avoid sailing on a certain ship or to a certain destination. Some of this scrimshanking is definitely conscious, but in many the motives for the illness have been referred to the unconscious. Measures to reduce the incidence of these systemic complaints would include:

Bronchitis—(*a*) Better ventilation and methods of removing dust in stokeholds.

(*b*) Ways of preventing men from coming direct from stokeholds or warm kitchens into the open. This could be done by the provision of a rest-room and baths.

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(c) To improve the welfare of the men is to improve the morale of the ship, with resulting decrease in the psychoneurotic components which perpetuate this disease.

Defective teeth.—Closer attention to the condition of the teeth and provision of dentures should be made at the signing-on medical examination.

Gastritis.—Like bronchitis, gastritis of neurotic origin could be helped by attention to the welfare of the men. In my opinion, however, it is more often associated with ill-cooked meals, and closer scrutiny of the credentials of cooks would help eliminate this complaint. Recently, while investigating an outbreak of enteritis on board a ship, I learned that the cook's only previous occupation had been that of a cement mixer, that he had had no training in cooking and that he boiled the ship's laundry in the urns used for making the crew's tea.

Skin diseases.—More spray baths and better forecastle conditions would help to reduce skin diseases.

In table II the proportional incidence of illness due to various diseases among Merchant Navy personnel is compared with that among men following another dangerous occupation (mining), and among the civilian male population in industry.[1]

TABLE II

INCIDENCE (%) OF DISEASE IN THREE GROUPS OF MEN

	Scottish miners	*Civilian Scottish men*	*Merchant Navy*
Tuberculosis	0·28	0·69	1·1
Tumours	0·1	0·3	0·6
Influenza	23·4	22·4	3·3
Infectious disease	0·4	1·6	5·2
Cerebral haemorrhage	0·07	0·19	0·1
Violence	15·7	12·2	15·9
Bronchitis and pneumonia	6·04	7·32	5·4
Upper respiratory	6·28	10·6	1·3
Gastric and duodenal ulcers	0·83	1·4	1·1
Appendicitis	0·9	1·6	1·0
Hernia	0·4	0·76	1·1
Gastritis	5·7	6·0	5·0
Diseases of kidney	0·5	1·1	0·9
Inflammatory skin	10·2	8·5	7·1
Skin diseases	1·3	1·8	8·3
Rheumatic and joint conditions	13·9	13·6	5·6
Cardiac and nervous debility	0·36	0·66	0·7
Neurasthenia	0·27	0·50	0·7
Undefined debility	0·33	0·43	1·0

From the table it is seen that the proportional incidence of tuberculosis among merchant seamen is 4 times as high as that in miners, and fully 1½ times as high as the relative incidence of the disease among the civilian male industrial population. The proportional incidence of accidents is highest among merchant seamen, and this also applies to skin diseases. The disease terms which are generally used to denote nervous strain (e.g., cardiac and nervous debility and neurasthenia) show that among merchant seamen the proportional incidence is higher than among the other two groups under review.

THE MOTHER AS PAINLESS SPECTATOR

Dr. THEODORE JAMES (Gwelo, S. Rhodesia) writes that he has employed the method of local anæsthesia in childbirth advocated by Sheldon (*Lancet*, 1941, ii 569). 'Omnopon' and hyoscine were used to help the mother (a primipara of 27) through the first stage. When the head was on the pelvic floor 1% procaine with min. 10 of 1 in 1000 adrenaline in 100 c.cm. was used to infiltrate the perineum, the injections being made, as Sheldon recommends, over the external abdominal ring, medial to the tuberosity of the ischium, and into the perineal body. The mother completed the second stage easily and painlessly except for the bearing down pains which she used to the best effect; and she insisted on watching the egress of the child's head in a hand mirror; when it was crowned she knew nothing about it, and when the head was born she looked on. She sustained only a very small tear of the vaginal mucous membrane. The emotional and psychological effect was, he says, a pleasure to see. The mother looks back on the birth of her child with interest and satisfaction.

1. Department of Health for Scotland. Report on incapacitating sickness in the insured population of Scotland, 1933–34, Edinburgh, 1935.

PENICILLIN IN WAR WOUNDS

A REPORT FROM THE MEDITERRANEAN

PENICILLIN has been on trial for combating wound sepsis in North Africa since July, 1942, and a preliminary report has now been made to the War Office and Medical Research Council by Prof. H. W. Florey, FRS, and Brigadier Hugh Cairns, FRCS.

The object was not primarily to ascertain whether penicillin is capable of controlling gram-positive organisms in septic conditions—this has been amply demonstrated in England—but to answer the questions: Can penicillin be used effectively in the field at all; and if so, how much is required, and at what place in the Army organisation can it be used to the best advantage? Since a quick answer was wanted, the work has been compressed into three months, a period too short for full assessment of the results.

It is now comparatively easy to administer penicillin parenterally—an effective dosage is known and methods of administration have been worked out—but supplies are too small to permit of the large doses required by this route. Here the problem was to work out techniques for giving small amounts by local application which would be simple enough to be used by surgeons and nursing staff in the busy period of battle. The report is based on the treatment of more than 300 battle casualties. No attempt has been made to compare the value of penicillin with that of the many alternative methods of treatment in use. This would be an undertaking of great magnitude, and the report mentions that after four years of war there are still no conclusive observations on the effect of sulphonamides in the prevention and treatment of wound sepsis. Moreover, there seem to be no available figures on such points as the proportion of fractures which become chronically septic, the number of wounds successfully sutured, and so on.

PLAN OF THE INQUIRY

The experience of Florey and his colleagues in Oxford from 1940 onwards made it clear that penicillin might play an important part in the control of infection associated with war wounds if it could be obtained in sufficient quantity. A supply was sent out to Cairo from Oxford in July, 1942, and the promising results obtained with this and batches from elsewhere by Lieut.-Colonel R. J. V. Pulvertaft led to attempts to manufacture penicillin in Egypt. Pulvertaft and Colonel J. S. K. Boyd were convinced that of all the antibacterial substances they had tried penicillin offered the best prospect of cleaning up the chronic sepsis met with in base hospitals, and Pulvertaft began experiments with crude penicillin he made himself. As further supplies became available, early this summer Lieut.-Colonel Ian Fraser, Major Scott Thomson, and soon afterwards Professor Florey and Brigadier Cairns went out to North Africa; at home Flight-Lieutenant D. C. Bodenham was studying the effects of penicillin in burns and other surface wounds (his report appears on p. 725 of this issue of THE LANCET), and it was being tried at the Military Hospital (Head Injuries) in cases of pyogenic meningitis which did not respond to sulphonamides.

Fraser and Scott Thomson arrived in Algiers after the end of the fighting in Tunisia, and studied the effects of penicillin on a miscellaneous collection of cases of chronic sepsis. They found that where penicillin-sensitive organisms were present they could be eliminated from accessible surfaces, but that gram-negative ones persisted; deep lesions were difficult to treat, and the method of instillation through tubes gave poor results. Parenteral exhibition of the sodium salt successfully eliminated sensitive organisms from bone and other infections.

From these cases it was apparent that it was far too late to start penicillin treatment, weeks or months after wounding, at a rear base hospital, and arrangements were made to treat cases from the next campaign at forward base hospitals. It would clearly effect a valuable saving in man-power if a method of treatment could be evolved which would prevent infection of the larger flesh-wounds and permit of early suture, with consequent earlier return to duty. There were no reliable figures to show the number of delayed primary sutures

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or secondary sutures performed at an early period in this theatre of war, but the proportion of wounds sutured does not seem to have been high. In the Eighth Army, for instance, the time between wounding and secondary suture appeared to run into weeks, at best. This is not surprising, for it seems fairly certain that notwithstanding the routine use of sulphonamides most battle casualties are at some time infected. Suturing in the forward areas was therefore strongly deprecated, owing to the many catastrophes which had followed this procedure.

With these considerations in mind, an attempt was made to suture soft-tissue wounds—those not involving bones or the major cavities—at the first hospital where the patients could be held for observation, penicillin being relied on to check or abolish infection by gram-positive organisms. Cases were received at the forward base 2–22 days after wounding, a few wounds among airborne and area troops being less than 12 hours old. Their previous treatment had been the standard Army one of excision (of varying and often excessive dimensions), the application of sulphanilamide powder, and the administration of 2·5 g. of sulphanilamide twice daily. Practically all the wounds were more or less infected, and they were of such a nature that no surgeon engaged in the present observations would have considered closing them in the condition in which they were received.

A group of compound fractures was also observed. The present practice in such cases is to provide good drainage, with removal of the obviously necrotic material and foreign bodies. Opinion has veered from massive excision to more moderate procedures. The limbs are enclosed in plaster or otherwise immobilised after placing sulphanilamide powder in the wound and dressing with soft-paraffin gauze. Official instructions in the Middle East are to give sulphanilamide by mouth during transport, and, if necessary, subsequently; but this treatment cannot always be carried out regularly. The treatment probably gives good results eventually in most cases, but many patients pass through a chronic suppurating condition leading to a long convalescence, loss of the limb or even life. This particularly applies to fractured femur.

Thus most fractures mean either the complete loss of the man, or at best a long period of inactivity and rehabilitation. An attempt was therefore made to close open fractures by suturing the wound, gram-positive organisms being controlled by the parenteral administration of sodium penicillin for 5 days.

A third series of observations were made on the control of sepsis in various types of head injury by two neurosurgical units. There is undoubtedly a big field for investigation in the use of penicillin in abdominal and chest injuries, but no observations of such cases are included in the present report.

The study was extended by Fraser and Major J. D. MacLennan in Sicily. There the plan was for them to see flesh-wounds early, at a CCS or FSU, trim the wounds, and dress them with penicillin-sulphanilamide powder, the patients then being sent back to the general hospital at Tripoli where further bacteriological examination and immediate suture could be carried out.

METHODS OF ADMINISTRATION

If penicillin was plentiful there can be no question that parenteral administration should be practised in nearly all cases. By this route the agent is brought by the blood-stream to all viable tissues, preventing the multiplication of susceptible bacteria in those tissues. But supplies are still extremely small and it has therefore been necessary to explore the possibility of using small quantities locally. Since penicillin is rapidly absorbed it must be applied frequently, and in a concentration greatly in excess of the minimum required for bacteriostasis at the immediate surface; it is of little value to sterilise the surface of a wound if bacteria are left a few millimetres below the surface or locked away in pockets.

Local application.—In this series four forms of local application have been used:

1. As a solution of the calcium salt in distilled water or saline (250–500 units per c.cm.).
2. In a cream with lanette wax, which will hold the penicillin in contact with the tissues longer than is possible with a watery solution (250 units per g.).
3. As crude dry calcium penicillin, applied directly to the infected surface, the penicillin dissolving in the fluid present. This method may be unnecessarily wasteful, for the powder is difficult to spread thinly over a large wound.
4. As a powder diluted with a sulphonamide, insufflated on the infected area with a blower; here the diluent was sulphanilamide, but Bodenham and others have used sulphathiazole (500–5000 units per g.).

In the treatment of soft-tissue wounds, after the usual surgical excision, small rubber tubes with one hole at the end were inserted, usually through stab-holes, so that fluid injected down them had a good chance of reaching all parts. The wound was then sewn up. Up to five tubes were used, according to the size of the wound. An adequate dosage was found to be about 3 c.cm. (750 units) injected every 12 hours. The ends of the tubes were brought out through the main dressing, so that injections could be performed with little disturbance. In most cases it is sufficient to leave the tubes in for 4 days. It was found best to give the first injection of fluid through the tubes while the patient was still on the operating-table. Penicillin-sulphanilamide powder was dusted on any raw surfaces after removal of the tubes.

A few wounds were sutured without tubes after a single introduction at the operation of not more than 10 g. of penicillin-sulphanilamide (5000 units per g.). In wounds where œdema made closure difficult, the open wound was at first insufflated daily with penicillin-sulphanilamide (2000 units per g.), tubes being inserted and the wound sutured when the œdema had subsided. In some particularly dirty wounds, such as amputation stumps and compound fractures, tubes were put into the unsutured wound and twice-daily injections given for 5 days.

For wounds that had been infected for many weeks a lanette wax paste was used as a daily dressing. This method may have advantages where much slough has to be removed, or for cavities difficult of access.

In the cases treated at a CCS a penicillin-sulphanilamide powder, containing 5000 units of penicillin per g., was inserted into the wounds after the usual trimming; these wounds were left open, covered with soft-paraffin gauze and the usual dressing.

Parenteral administration.—For intramuscular or intravenous injection the sodium salt was used, carried either dry or in strong solution in ampoules or bottles, and diluted with distilled water when required. A dose of 15,000 units three-hourly was sufficient to maintain a blood concentration which would inhibit a test staphylococcus. The amount of pain caused by the injections varied widely with different batches of penicillin; some caused no serious discomfort, while others produced so much pain, induration and stiffness that only the toughest patients could stay the course.

Because of the pain of intramuscular injection, the intravenous route was tried, hospital blood-transfusion service supervising the drips. The penicillin was administered by continuous drip in glucose saline, 2 litres containing 100,000 units being given in 24 hours. Here the different batches varied widely in their pyrogenicity, and there seemed to be no correlation between pain-production or intramuscular injection and tendency to produce fever and rigors.

Probably the best practice will be to use continuous intravenous therapy where possible, and the intramuscular route elsewhere. It is hoped that manufacturers will produce a pyrogen-free penicillin.

RESULTS

Chronic septic wounds.—Septic wounds 3–4 months old were treated at Algiers by Fraser, with Scott Thomson doing the bacteriological investigation. The wounds were infected in about equal proportions with hæmolytic streptococci alone, staphylococci alone, or these organisms in combination. Most of them also contained coliform organisms. All were suppurating.

In about half of the 16 flesh wounds secondary suture or skin-graft had been tried and failed; in many the infection was deep-seated; in most the patient was in good general condition. Local application of penicillin quickly controlled the gram-positive organisms and rendered the wounds suitable for skin-grafting or secondary suture.

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Most of the 18 fracture patients were very ill, with fever, anæmia and loss of weight. Three had large bedsores, and in some of them deep-seated abscesses had formed beneath partly or wholly healed wounds. Flies were numerous and persistent, and it was often impossible to prevent infestation with maggots. All the patients had had sulphonamides locally, and by mouth or intravenously as well. The results of local application of penicillin were poor. With parenteral administration of sodium penicillin some dramatic recoveries were obtained, though in two cases of fractured femur it failed to control the infection. It was concluded that treatment of old-standing septic compound fractures would require large amounts of sodium penicillin, which might be more profitably used in more recent wounds.

Recent soft-tissue wounds.—Early closure of 171 soft-tissue wounds was carried out by 10 surgeons at 5 general hospitals at Tripoli and Sousse. Most of the wounds were 3–12 days old when closed. As experience and confidence grew it was found possible to close almost all wounds, except those in which a missile had produced gross destruction of skin. Most of the wounds were infected, and some were actually purulent, but no case was rejected for this reason, and the wounds were closed before the results of the preliminary bacteriological examination were known. Yet none of these patients was placed in danger by the closure, and only once was it necessary to release the stitches.

The progress of these wounds followed a fairly uniform pattern. They are remarkably free from reaction. On the second to fourth day thin salmon-pink purulent fluid can be aspirated from the depths of the wound; this is rich in healthy polymorphs and on culture yields coliform bacilli. When unveiled on the eighth to twelfth day the wound may be found bathed in thin salmon-pink pus which goes green on the dressings, but after this gram-negative pus is wiped away the wound and stitch-holes are found to be clean and free from œdema or redness—the wound is discharging pus and yet healing well. Thereafter, provided the stitches are not removed too soon, linear healing results. The presence of pus must not be regarded as an indication for removing the stitches immediately; tubes were removed on the fifth day without disturbing the dressings or plaster, and stitches on the tenth to fourteenth day or even later. *B. pyocyaneus* often persists in the wounds until healing is complete.

At or after 3 weeks the wounds could be classified in three groups: 104 were united and epithelialised throughout their whole extent and quite dry; 60 were still gaping and granulating in one or more small areas but usually healed rapidly by granulation; in 7 the whole or greater part of the wound had broken down, failure usually being due to errors in the technique of wound closure.

Thus in the closure of recent flesh wounds, to quote Lieut.-Colonel J. S. Jeffrey, "with penicillin the obstacle of infection has been practically overcome."

Recent fracture.—Treatment of battle casualty compound fractures with penicillin was confined to two general hospitals—at Tripoli and Sousse—in order to concentrate the available sodium penicillin. The aim was to prevent chronic infection of the fracture and to convert it as soon as possible into a closed fracture by suturing the wound. It was felt that only parenteral treatment was likely to be effective in disseminating the drug about a compound fracture. Altogether 36 fractures were treated; they were mostly comminuted fractures of long bones, with wounds of sufficient size to warrant attempts at closure. They had all been temporarily immobilised in the forward area and were 5–14 days old on arrival at the forward base hospitals. In 31 it was possible to suture the wound completely; in the other 5 this was mechanically impossible. In the forward areas 27 had been treated with sulphanilamide and soft-paraffin gauze; in 9 Fraser had gone forward and given initial treatment with penicillin-sulphanilamide powder insufflated into the wound.

The routine was to give a 5-day course of sodium penicillin either by 3-hourly intramuscular injections or in a continuous glucose-saline drip infusion, totalling 500,000 units. Gram-positive cocci were present on arrival at the base in 18 of the 36 fractures, and at the end of penicillin treatment they were present in 15. The presence of gram-positive organisms did not run parallel with success or failure of the wound healing; they were present in some cases which made an excellent recovery, but they were always present in cases which broke down completely. In 5 of the 36 cases the treatment failed, but these came early in the series when the technique was being developed. One patient died of head injury; the remainder, after 2 months' observation, were either healed or free from serious infection; there was no evidence of delayed bony union.

It was thought that too much was attempted in the way of wound closure—in a comminuted fracture it is wise to leave potential drainage to the exterior for the first week or ten days—and that the dosage in fractures of the tibia and femur was too small; a total of 700,000 to 1,000,000 units should be given over 7–10 days, though this may be unnecessary where penicillin is given in the forward area.

Gas gangrene.—It was thought impracticable to treat a developed case of gas gangrene by local application, and the seven cases treated all received sodium penicillin parenterally, the dosage ranging up to 750,000 units. Four of the patients recovered and three died; all were *Cl. welchii* infections. In two of the fatal cases the gas gangrene appeared to have been overcome when the patient died, in one case from toxæmia, possible anaphylaxis and acute dilatation of the stomach, and in the other from malignant tertian malaria; but the post-mortem investigations are not yet complete. Of the cases which recovered, two were severe, the gangrene involving the calf in one and the upper thigh in the other; one in an amputated thigh was limited to the remaining half of the sartorius; and one was a gangrenous cellulitis of the leg.

In one of the fatal cases histological examination of the muscles of the wound showed very extensive macrophage reaction at the edge of the zone of necrosis of the muscle. Since spreading gas gangrene is said to produce no cellular reaction, this macrophage reaction may be regarded as additional evidence that penicillin in adequate dosage is effective against gas gangrene.

It is clear from this experience that penicillin will not counteract toxæmia; all the dead muscle should be surgically removed and massive doses of anti-gas-gangrene serum given. Fulminating cases, with profound toxæmia, are not likely to be saved by penicillin. Penicillin may be expected to play an important part in prevention.

Head-wounds.—The current practice of closing head-wounds completely after excision and the local application of sulphathiazole, as described by Eden in the *Lancet* of Dec. 4 (p. 689), has given satisfactory results in recent wounds; thus in the El Alamein and Tunis battles primary healing of wounds up to 3 days old was obtained in 90% of cases. In the present investigation attention was particularly directed to penetrating brain injuries more than 3 days old, and at Tripoli and Sousse 23 brain-wounds 3–12 days old were treated with penicillin. Almost all of them were infected with gram-positive pyogenic organisms, and about half were frankly suppurating. The wounds were excised, cleaned and closed, injections of calcium penicillin solution being given 12-hourly for 3–5 days through a stab-hole into the brain cavity, the average total dosage being 15,000 units per case. In addition, calcium-sulphanilamide powder was applied to the wounds during dressings and occasionally during operations; intramuscular penicillin was given to 3 patients who had compound fractures of the limbs as well as brain injuries.

There were 3 deaths in the 23 cases, 2 of them from infection. In the remainder, wound healing was satisfactory, except in one case where the wound edges broke down sufficiently to expose a small brain fungus which subsequently healed. Bacteriological examination of material aspirated from the brain-wounds showed that, with penicillin, gram-positive cocci disappeared from the wound within 48 hours in most cases.

This experience suggests that penicillin deserves a more extensive trial in brain-wounds for which definitive treatment cannot be obtained before 72 hours. For brain-wounds less than 3 days old there seems to be no case for using penicillin while it is scarce.

Non-penetrating wounds 4–16 days old, which were suppurating and would hitherto have been left open,

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were successfully closed and treated with penicillin solution through tubes for 3–5 days, using a total dosage of about 3000 units. In the scalp wounds not associated with fracture of the skull, first intention healing after excision could be secured with a single application of 1–3 g. of penicillin-sulphanilamide powder, provided the powder was not washed away by bleeding during closure of the wound.

Gonorrhœa.—In Tunisia many cases of gonorrhœa were occurring in highly trained fighting troops, such as parachutists, shortly before they were due to fight, and the proportion of sulphonamide-resistance seemed to be much higher than at home. Nine cases which had failed to respond to sulphonamides, and one fresh case, were treated with sodium penicillin, all other forms of treatment being withheld. The dosage was based on previous data for staphylococcal and other infections, most receiving 12 intramuscular doses (total 180,000 units) in 48 hours. Urethral discharge promptly disappeared in every case—"like turning off a tap," says Major Priest. Most of them were kept under observation for 2–4 weeks after treatment and no relapse was seen.

Burns.—Penicillin applications were tried in a few extensive burns which had remained persistently infected with hæmolytic streptococci in spite of sulphathiazole by mouth and flavines and sulphadiazine locally. Their response to extremely small amounts of penicillin-sulphanilamide powder (20,000 units) was uniformly rapid, and free grafts took satisfactorily in spite of the presence of gram-negative pus.

* * *

The following officers were responsible for different sections of the report.

Bacteriology: Major Scott Thomson. Chronic septic wounds: Lieut.-Colonel Ian Fraser; Major Scott Thomson; Captain A. Pirie. Soft-tissue wounds: Lieut.-Colonel J. S. Jeffrey. Recent battle casualties: Lieut.-Colonel E. L. Button. Closure of large soft-tissue wounds: Lieut.-Colonel D. W. Jolly; Major W. E. Hamilton. Efficiency of penicillin in war wounds: Lieut.-Colonel A. L. d'Abreu; Major H. L. de Waal. Soft-tissue wounds at a general hospital: Captain G. K. Tutton. Prevention of wound sepsis: Lieut.-Colonel Fraser; Lieut.-Colonel Jeffrey; Major J. D. MacLennan; Major Scott Thomson. Primary closure of wounds: Lieut.-Colonel Fraser. Recent compound fractures: Lieut.-Colonel Jeffrey. Head wounds: Brigadier H. Cairns; Major K. C. Eden; Major J. Shoreston. Gonorrhœa: Major W. H. D. Priest. Burns: Major Patrick Clarkson.

The report is not on sale. A few copies, containing full tables and figures, may be seen by application to the War Office (AMD 7).

PSYCHIATRISTS IN CONFERENCE

PSYCHIATRISTS, especially those whose work has lain in mental hospitals chiefly, are aware of the disadvantages that have arisen from their relative isolation. The assurance given not long ago that the Minister of Health would not exclude psychiatric problems from consideration when planning future medical services relieved much apprehension. It is, however, recognised that there are matters in connexion with the treatment of the insane which cannot be put right without changes in the law, and that the chances of prompt legislation on such a matter are less hopeful than most psychiatrists would wish. There are many psychiatric questions, apart from modifications in the law, which will have to be taken into account in a better organised comprehensive health service. The Royal Medico-Psychological Association has recently put forward some broad proposals to this end, to serve as a basis for discussion.

Among the chief proposals were that—

Mental health committees and mental advisory committees should be established in every area of the country.

All matters appertaining to mental health administration should be removed from public assistance.

The name of the Board of Control should be changed to the Board of Mental Health and its powers should be extended.

A medical officer of mental health should coördinate the work in each area.

A medical superintendent should be in complete control of each mental hospital and mental deficiency institution.

Other proposals dealt with the better education of medical students in psychiatry and psychology, the development of psychiatric units at universities and in general hospitals; with more generous staffing of mental hospitals and more comprehensive measures for the care of the mentally defective. All delinquent children, it was suggested, should be examined by a psychiatrist whose report should be available to the courts.

Since these proposals had not received from psychiatrists all the consideration desirable in any final recommendations that might be made by the association, it was decided at the quarterly meeting held on Nov. 24 to form a broad committee representative of psychiatrists of every kind, to formulate their views for submission to the association.

A general discussion of postwar psychiatry was held during the day. In an opening address Dr. Gordon Masefield, honorary secretary of the association, reviewed the problems of the mental health service, particularly affecting those working in mental hospitals. Dr. Aubrey Lewis and Dr. Rolf Ström-Olsen (whose paper was read in his absence by Dr. M. B. Brody) gave brief opening papers on psychiatric clinics, with particular reference to neurosis and child psychiatry, and to problems of location and staff. In the afternoon Dr. Norwood East discussed delinquency, and Dr. Noel Burke mental deficiency. Dr. East said that special problems in connexion with criminal behaviour called for experience such as the ordinary psychiatrist does not possess, and outlined the general plan for improved psychiatric care of suitable offenders. Dr. Burke advocated that the entire supervision of the subnormal, including defectives, should be transferred from public assistance authorities to a mental health committee, and urged other drastic revision of legal and administrative procedures. Air-Commodore R. D. Gillespie felt that provision should be made for teaching facilities in any reorganisation of medical services and drew attention to the need for staff liaison between mental hospitals and teaching departments.

LEBANON AND HASHISH

THE Lebanon and Syria have occasioned anxiety in other than political or constitutional questions. The illicit cultivation of hashish (cannabis indica) has, by its contraband export into Egypt, attracted the vigilant attention of Sir J. W. Russell, director of the Central Narcotic Bureau; his report to the Egyptian government for 1942 abounds with interest. As the result of two personal visits to the Levant states to investigate the source of the huge imports of hashish into Egypt, the director was able to secure the coöperation of the British and the Fighting French authorities in eradicating the pernicious hemp over large areas. A report made to General Catroux in July, 1942, stated that there were 150 hectares of Indian hemp under cultivation in the Levant states, producing 75 tons of dry raw hashish and 60 tons of prepared hashish; of these 90 hectares had then been cleared of the plant.

The British Security Mission in Syria and the Lebanon, under instruction from General Maitland Wilson of the 9th Army, and in coöperation with Monsieur Gautier and Lieutenant Boutillon of the Sureté Générale, proclaimed the cultivation of hashish, and proceeded to eradicate the growing hemp. The inhabitants were hostile, but Indian and Australian troops overcame the apathy or indifference of the gendarmerie and gardes mobiles. It appears that, under Vichy France, Syria and the Lebanon had become completely "hashish-minded," notwithstanding the laws in force against trade in the drug.

Sir J. W. Russell reports that the price of hashish wholesale in Syria was £E3 per kilo, that it sold in Egypt at £E35 to £E40 per kilo and further that if the destroyed hashish had been successfully smuggled into Egypt the dealers in Egypt would have realised £E4,200,000. The Director expresses the hope that the independent governments of Syria and Lebanon would carry out the law and prevent this flood of poison finding its way into Egypt.

". . . The nation's opportunity, when peace returns, of enjoying the arts and amenities of life will be dependent on its standards of health and prosperity, and these, in turn, ever more directly on science and its applications . . ."—Sir HENRY DALE in his presidential address to the Royal Society on Nov. 30.

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In England Now

A Running Commentary by Peripatetic Correspondents

IT would be good for all of us if we could change places with our patient an hour before he is due to go to the theatre for his operation. This is something of the atmosphere as it was described by one of my patients after an appendicectomy.

An hour before the operation (he writes) I am lying in bed not feeling too brave about it all. Along comes the nurse and gives me a hypodermic injection. It hurts—the needle is blunt, and she has to make several jabs to get it in. Anyway my nerves are all keyed up to a high pitch and I am probably just waiting to be hurt. I see by my chart left on my bed while the nurse was called away that I am running a high temperature. I have really a bad cough, and my heart is beating very rapidly as I feel it surreptitiously under the bedclothes. My pulse seems to be going 250 to the minute, or am I counting two pulses, one in my wrist and one in my thumb? I wonder will my heart stand the anæsthetic. I would like to see the doctor who is going to give me this. He ought to test my heart and tell me it won't pack up on me. I wish I had a drink—I do feel so thirsty. I am getting very sleepy now, but do not seem able to go off properly. I wish that nurse would not talk so loud. I thought she had quite a soft voice. It sounds to me like a foghorn now, I expect it is the dope they have given me. Heavens, here they are coming for me already and I am not asleep yet. It would have been a good idea to have put me in a room by myself with the blinds drawn, I might have been able to sleep then. They promised me I would be asleep before I was taken out of the ward. They start to wheel me out now. That jolt as they hit the jamb of the door did not help me to sleep, nor do the other jolts as they negotiate the corners along the corridor. I wish someone had put a drop of oil on the wheels of this trolley. The squeaks, apart from being disturbing to me, must be annoying for the other patients. There is quite a traffic jam now. The chap in the next bed to me was trundled along to the theatre an hour ago. Here he is being wheeled back. His job is over, lucky devil, but perhaps not so lucky. I take a quick peep at him as he passes. He looks dead to me and as if he had died in a horrible way. I am sorry I looked, I should have had a towel over my eyes. Here we are now at the annexe. It smells terribly of ether or chloroform. The anæsthetist comes and says, "Well old man, you should be asleep by now," and I agree. He puts the mask on my face and the smell of the rubber nearly makes me vomit. My sense of smell seems very acute and this stuff smells awful. It is choking me and I am going round and round. I can hear someone talking in the theatre. Now the anæsthetist is talking to the nurse. His voice seems to boom as if amplified. I wish the nurse would hold my hand. It seems childish, but there you are. Now someone is gripping me tightly, as if I was going to run away. I wish they would not do it, I want to sleep and forget. The doctor is telling the nurse about the chap in the next bed to me. He thinks I cannot hear him, but I can, although I feel miles away from my body now. I am sorry poor old Smith is a gonner, or as near as no matter. I hope I won't be in the same boat. I am floating in the air now and I am going up and up and up and then I am in my bed, the nurse is giving me a cup of tea and it is the next day.

* * *

It is somewhat humbling to human intelligence to have to admit that a large number of man's discoveries, especially in the medical sphere, have been made by mere chance. From Dr. Jenner's chance listening to milkmaids' gossip to Professor Gye's chance cold man has stumbled on rather than stalked his scalps. And yet, in the matter of these bacterial, mycotic and virous antagonisms, if we had sat down and considered, if we had cast our eyes back to the ages when man was in the womb of time, to the millions of hot, humid, Carboniferous years—surely the myocetal Golden Age—we might have guessed that these lowly organisms had fought out their quarrels and formed their various spheres of influence, offensive and defensive alliances, toxic attractions and repulsions, miasmal and chemical preferences, all these, long, long before their new food, Man, strutted Lord of All. And if, after the manner of the American tournament, we play one against the other, *Staphylococcus aureus* v. *Aspergillus niger*, *Penicillium pulchrum* v. *Bacterium gloriosum*, and so on, each playing each, then after a lot of trouble in a lot of laboratories, even more than is caused to the poor secretary by our local tennis tournament, we might get a pretty good idea of the hatreds and friendships, the cliques and discordances, in this vast village microscopic life.

One's imagination rebounds from contemplating this scene of petty strife to one of truly Wellsian proportions—the Great Health House in the capital city of the World State. We are in the Map Room; one of the many map rooms. On the wall is the score board of a huge tournament. All the diseases are playing each other in or on man; their names are written horizontally and vertically, and the dots on the squares show the frequency of their contests. The scarlatina-diphtheria squares, for instance, are almost spotted out, the spots are confluent, they get on splendidly together, but the spirochætal players of yaws and syphilis won't play, a cousinly hatred, so the squares are blank. The mumps-typhoid squares are . . . The telephone rings. A case of amœbic dysentery has occurred at Chowchu in a Chinaman who harbours an old *Tænia lonlium*. "H'm, that ought to be interesting," says the Head Referee and rings up the transport plane to take a team of skilled observers to witness the contest.

Do we know what effect mumps has on typhoid, if any, on *Tinea versicolor*, a mere dermal pet, on the killer of poliomyelitis? One would hardly think they had any effect at all on each other, but do we know? One would hardly think that the sores on the dairymaid's fingers would have any effect on the dreaded smallpox; it seems, on the face of it, a silly idea. The fact is that in many cases we do not know how or if diseases interact, but by keeping a record of the coincidence of diseases for a number of years in a large population, more or less on tournament lines, by noting those squares which statistically one might have expected to be moderately immaculate becoming spotty, and, more significantly those squares which one might have expected to be spotty keeping immaculate, we have a way of finding out.

* * *

"Se-ipsic is a first-class word," and I feel greatly encouraged. Would this not form an excellent motto for our postwar College of Terminology—or should it be Terminopathy, or rather Terminopathology? My teachers used to talk about the musculospiral and external popliteal nerves among themselves, but to us about the radial and peroneal. Wearied with war, we find them now permitting unrestricted interbreeding of those diverse terminologies—but, let me see, *is* the peroneal external or medial? I have no book but I believe it is the lateral boundary of the popliteal fossa. Se-ipsic!—yes, that truly should be in basic English. Ordered confusion! Russia, one contributor tells us, is out to graduate 25,000 doctors a year; but do they all have to learn three terminologies in one subject alone? Yes, se-ipsic *must* be our motto. The midwife may treat my pneumonias, but she will never know three names for everything, and even Osler did not learn the BNA and the Birmingham Revision. Happy day! A mustard plaster may not have helped over the serratus lateralis, but if I put it over the serratus anticus, or better the serratus magnus—well, who knows? Se-ipsic!

* * *

A Ministry of Health psychiatrist says that a large number of colds are emotional in origin. Now we see it all. The common cold, a running from the nose, is really the Superego pouring cold water—and mucus—on the erotic zone of the mouth, probably because the Id has been telling low stories, and the husky and altered voice are to prevent it telling any more. When a cold spreads round a family, office or school, that is just another example of mass hysteria.

* * *

Telephone Q: "Doctor, they say this is 2-day 'flu and I've had it for 4 days. Why is that?"

Ditto A: "I expect you've had it twice." (Hangs up).

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Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

THE House has now had three days of general debate on the address, one day devoted to the release of Sir Oswald Mosley, and is now considering amendments which raise vital questions of policy. The grand inquest of the nation is in progress.

Mr. Oliver Lyttleton, in his reply to the general debate on the third day said, "We know the victory is certain, and we think it is imminent, but we are not expressing an opinion in point of time." The order of priority in our postwar problems which Mr. Lyttleton laid down was first, housing and town and country planning, second social security, and third war production in reverse. Overcrowding in the cities is serious and deterioration of housing conditions, owing to lack of labour for repairs, is the preoccupation of local authorities. In rural areas the problem is almost as pressing as in the towns. The demand for houses after the war cannot be resisted. To expedite repair and reconstruction now and building on a large scale when that becomes practicable the Government has enlarged the functions of the Ministry of Works which will be the authority to which the Ministry of Health will look for all "plans, designs, specifications, materials and the technique of construction and costs of houses." The local authorities will deal with the Ministry of Health, and the Ministry of Works will really be the technical department. The immediate problem is repairs. The next stage will be the erection of houses to meet temporary or emergency conditions and for this purpose new forms of building are being tried. The House has promised that in three or four months eight or nine demonstration houses would be on view. The long term policy envisages the employment of a labour force with a calling-up of 1,250,000 over a period of twelve years.

It seems unlikely that there will be acute unemployment for some time after the war, for there will be a vast demand for consumer goods—textiles, clothing, boots and shoes, carpets, household linen, crockery, glassware and furniture. There will be also a vast demand for labour to make up the arrears of maintenance in connexion with every activity of the national life. But here is a danger not always appreciated. For there will be, outside this country, a prodigious demand for consumer goods and capital goods. In devastated areas UNRRA will function. But rigid control will be necessary to see that a whirlpool of inflation outside these islands does not pull our production and distribution into the maelstrom. Those who dislike controls should consider these things; controls will be necessary for our own self-preservation.

Mr. Lyttleton, speaking of the problem of the reorganisation of the medical profession, asked whether it was realised that it involved altering the numbers of those entitled to "a comprehensive medical service" from 18 million, the present insured population, to over 44 million. This is a large administrative problem and it is probably giving Mr. Willink cause for thought.

The fourth day of the debate was devoted to an amendment challenging the Home Secretary for his release of Sir Oswald Mosley. Much of the criticism was directed against the medical grounds on which the Home Secretary acted and about which information was meagre. Owing to the arrangements which come into operation at the beginning of a new session the Home Secretary could not be asked questions till the day after the Mosley debate. This made it impossible to get much information. The actual wording of the doctors' report showed clearly it had reference to previous expressions of opinion. It is widely felt that a short medical history of the case with a record of the opinions expressed and of the reasons for the examination this year would be useful and desirable. In the course of his statement, Mr. Morrison said that Sir Oswald Mosley had suffered from recurrent attacks of phlebitis during his detention at Brixton and Holloway, but that up to June, 1943, these gave no serious cause for anxiety. The authorities then "felt concern not only about the phlebitis but also about his general condition. His weight had fallen continuously and substantially and his phlebitis was extending." Hence a further series of examinations, and his final release from Holloway to a form of house arrest. In view of these statements by the Home Secretary, the publication of a full medical report, including a statement on any factors in prison life which affect all prisoners, is certainly desirable if the case is to be fully understood. It was urged in the debate that adequate medical and nursing services exist at Holloway and that hospital services outside the prison, if necessary, could have been arranged for Sir Oswald Mosley as is done for ordinary prisoners.

ROYAL COMMISSION ON POPULATION

ON Dec. 1 Mr. C. A. ATTLEE, Lord President of the Council, made the following statement in the Commons: The Government have decided to set up a Royal Commission to investigate the birth-rate and trends of population and the Lord Chancellor has accepted the chairmanship. The other members of the Commission will be announced as soon as practicable. The terms of reference will be as follows:—

"To examine the facts relating to the present population trends in Great Britain; to investigate the causes of these trends and to consider their probable consequences; to consider what measures, if any, should be taken in the national interest to influence the future trend of population; and to make recommendations."

The Government have also decided to set on foot immediately a number of inquiries of a technical kind. The exact scope and character of these investigations will be determined in consultation with the chairman of the commission. The results will, of course, be made available to the commission as soon as possible and it is expected that in the meantime the commission will find it practicable to explore and take evidence upon the more general issues connected with the subject.

The Duke of DEVONSHIRE who made a similar announcement in replying to the debate on population problems in the Lords added there were at least three broad heads under which the technical issues must be examined. There was first the *statistical* group which was a matter of simple collection of figures and calculation, but involved a high degree of expert knowledge to sift the various statistical factors, assess their significance and to project them into the future. Then there were the *medical and biological* factors, ranging from immediate physiological conditions that may interfere with fertility to remote biological factors that may have far-reaching and deep-seated causes. But in spite of this diversity it had been thought advisable to allocate the work of technical inquiry under this head to one group which can, if necessary, divide itself up to consider the various technical details. There were also *economic* factors—what part they have played in population trends, the part they may still be playing, and what may be the effects of the population trends on our economic life in the future.

QUESTION TIME

Second Rushcliffe Report

Replying to a question, Miss F. HORSBRUGH announced that the Minister of Health had received this report, which deals with male nurses in hospitals, with nurses employed in the public-health services, with nurses engaged in domiciliary work, and with trained nurses employed in nurseries. The Minister had communicated with local authorities, the British Hospitals Association, and the Queen's Institute of District Nursing commending to them the recommendations as to salaries, emoluments, and conditions of service, and informing them of the grant which is payable, as in the case of the previous report.

Patulin

The Medical Research Council have accepted an invitation to undertake the organisation of controlled clinical trials of patulin on a considerable scale, and arrangements are in hand for instituting these immediately. For the time being the use of patulin in the treatment of the common cold must be regarded as still in the experimental stage. The preliminary trials have not given consistent results, although some of these have been promising, and it is uncertain what value the drug will eventually prove to have. It will necessarily take some months to collect adequate information on this point, and as regards the best methods of administration, the proper dosage, and the conditions under which the drug can be used with

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safety. It would be inadvisable to take steps to make patulin generally available until there is sufficient evidence on these questions. (Miss HORSBURGH replying to Colonel ARTHUR EVANS.)

Infant Mortality in Scotland

Mr. D. KIRKWOOD asked the Secretary of State for Scotland if he was aware that the rate of infant mortality among the poorer classes had, according to recent medical statistics, been since the last war the highest in the civilised world; and what steps he was taking to remove this disgrace from the social life of the country.—Mr. T. JOHNSTON replied: According to the latest information available to me, the Scottish figures, bad as they are, are not the highest even among the nations of Western Europe. The causes of the variations in these infant mortality figures are not always apparent, but a report on the subject by a committee under Sir John Orr's chairmanship, set up at my request by the Scottish Scientific Advisory Committee in June 1942, will shortly be published.

Mr. KIRKWOOD: Is the Minister aware that the child death-rate in Glasgow is higher than it is in Tokyo?—Mr. JOHNSTON: Figures for 1936 relating to the cities of Glasgow and Tokyo are to the effect stated. But the official statistics published by the League of Nations show that, for the five-year period 1934–38, the infant mortality-rate for the whole of Japan was half as high again as for Scotland.

The steps we are taking to deal with this matter are, first to find out what are the deficiencies in the way of homes, housing and so on—to find out what were the causes of it. The Orr Committee was set up for this purpose, and the report is now in hand and I expect it will be published.

Pulmonary Tuberculosis in Scotland

Mr. H. MCNEIL asked the Minister if he would give the number of new pulmonary tuberculosis cases notified between June 1, 1943 and Nov. 1, 1943; and the numbers for the comparable periods in 1942, 1941 and 1940, and Mr JOHNSTON replied: Notifications between June 1 and Nov. 1, 1943 were 3073. The corresponding figure for the same period in 1942 was 2633, in 1941 2361, in 1940 2118.—Mr. MCNEIL: Will the Minister now agree, from the figures he has supplied, that his scheme for dealing with tuberculosis by excluding chronic sufferers has obviously failed to restrict the spread of infection in the country?—Mr. JOHNSTON: The two things have no necessary connection whatever.—Mr. MCNEIL: Will the Minister tell me to what he attributes the increase since he thinks he has cut out an area of infection? Mr. JOHNSTON: My honourable friend asked for statistics going back to 1940. The scheme to which he alludes now is another matter altogether. It is dealing entirely with war-time temporary conditions.

Industrial Training of Disabled Men

Mr. W. A. BURKE asked the Minister of Labour, if he was aware that men were being discharged from the services on medical grounds and entering civil employment for which they were physically unfit, and would he make arrangements for all men discharged from the services to be interviewed at an employment exchange for the purpose of receiving explanations of rehabilitation and training schemes.—Mr. E. BEVIN replied: The arrangements for interviewing men from HM Forces on medical grounds or because of disablement include interviewing at hospitals and other invaliding establishments as well as at employment exchanges. Steps are taken by means of reports and discussions to get expert medical advice as to the individual's condition, and as to the most suitable kind of occupation. All local offices of the Ministry have full particulars of the training and other schemes designed to assist the satisfactory resettlement of persons suffering from any form of disability—whether as the result of service with HM Forces or from other causes.

Social Security Proposals

Sir JOHN MELLOR asked the Prime Minister which ministers would be specially concerned with the preparation of the Government's proposals regarding an enlarged and unified system of social insurance, a comprehensive health service and a new scheme of workmen's compensation, respectively; and whether any particular member, or members, of the War Cabinet would specially review this work.—Mr. ATTLEE replied: The ministers specially concerned with these matters are the Minister of Health and the Secretary of State for Scotland, the Minister of Labour and National Service, and the Home Secretary. The Government's proposals for social security are being formulated under the direction of a committee of ministers; and the Minister without portfolio has, and will continue to have, a special responsibility for coördinating the work involved in presenting the social insurance scheme as a whole to that committee. As regards the last part of the question, these are matters falling within the scope of the Minister of Reconstruction.

Medical Personnel (Priority) Committee

Sir E. GRAHAM-LITTLE asked the Minister of Health how many times this committee had met during the past 12 months; and what was the date of the last meeting?—Mr. H. WILLINK replied: The committee has held seven meetings during the past 12 months, and last met on Nov. 10.

Emergency Medical Service

Sir E. GRAHAM-LITTLE asked the Minister of Health whether he would state the present cost of the Emergency Medical Service and the number of salaried medical practitioners engaged; and whether, as this service was planned more than four years ago to meet events which had not happened and had resulted in a redundant supply of doctors to hospitals and districts remote from towns and to small specialists staffs at voluntary and teaching hospitals, especially in London, and withdrawing adequate medical attendance from the civilian population whose illness risks had at the same time increased, he would immediately readjust the distribution of medical man-power.—Mr. WILLINK replied: The cost of the salaries, fees and expenses of medical officers enrolled in the EMS is at the rate of approximately £1,200,000 a year, and the number of medical officers receiving whole or part-time salaries, which fluctuates somewhat from time to time, is about 1550. I do not accept the implications in the second part of the question or see any justification for the redistribution of hospital staff suggested. Although the Service has fortunately not been called upon to treat so many casualties as was at one time expected, it has been employed in caring for the numerous other classes of patients brought within the scope of the EMS. Among these classes are large numbers of civilian sick transferred from town hospitals to outer hospitals having more adequate facilities for their treatment, and other civilian patients transferred from hospitals with long waiting-lists. In the result the emergency scheme has greatly expanded the hospital facilities provided for the civilian population as a whole and has made specialist medical skill available to much larger numbers of patients than ever before.

National Health Service in Australia

Sir E. GRAHAM-LITTLE asked the Minister of Health whether he was aware of the successful protest made by the Federal Council of the British Medical Association in Australia against the attempt made by the Federal Government to bring about the nationalisation of the medical profession in Australia on much the same lines as had been proposed for Great Britain in speeches by the ex-Minister of Health, and whether he would apply the argument put forward by the Australian Association also to this country, that it was unjust to make plans for the medical profession while many doctors serving in the forces could not make their views heard.—Mr. WILLINK replied: I am alive to the importance of enabling doctors in the Forces to see for themselves what the Government's proposals are, and to discuss them and express views on them before legislation is undertaken. That is one of the objects of the forthcoming white-paper.

Mosley's Release

Replying to questions on medical reports on Sir Oswald Mosley, Mr. H. MORRISON said the reports which he had received did not include any estimate of the length of treatment which might be needed to guard against an extension or recurrence of the condition from which Sir Oswald Mosley was suffering, and he was advised that it would be premature to express any opinion on the point. As he had explained, he would have no hesitation in ordering immediate detention, irrespective of any medical considerations, should he come to the conclusion that the interests of national security so required.

Lord Dawson of Penn had suggested that it would be helpful if the prison medical authorities would confer with himself and Dr. Geoffrey Evans, both of whom had attended Sir Oswald Mosley as their private patient, or, alternatively, with two other doctors of equal standing. As Lord Dawson and Dr. Evans had already examined Sir Oswald Mosley and were in a position to judge the progress of the disease, the prison

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Letters to the Editor

PROFLAVINE IN CLOSED WOUNDS

SIR,—Russell and Falconer and also Hawking report necrosis of muscle after sewing up wounds in animals treated with proflavine. Lieut.-Colonel Ian Fraser, RAMC (personal communication), found that in two fully debrided wounds where there was little exudate, no pus and no granulation barrier, considerable necrosis of deep tissues and gangrene of the skin edges took place after 5 g. of proflavine had been inserted and the wounds closed without drainage. On the other hand, a small series of wounds treated with 1% proflavine mixed with sulphathiazole closed up and healed by first intention.

We treated about 300 old septic but open wounds with much smaller quantities of proflavine (average 0·5 g.) and we never saw any necrosis; however, an eschar as already described was frequently found. We also used smaller quantities (average 0·1 g.) of proflavine in conjunction with 10 g. sulphanilamide in 14 compound fractures which were later closed up; there were no harmful effects. In the original cases the proflavine was used without neutralisation but latterly 0·25 g. of bicarbonate has been added to each gramme of proflavine.[1]

It appears that proflavine should only be used in open wounds and not more than 0·1–0·5 g. should be used at one time. Pending an adequate supply of some more satisfactory substance (e.g. penicillin), it seems that proflavine is the best drug available for the treatment of such wounds when they are infected with staphylococci or are purulent. Proflavine may possibly be of some value in gas gangrene when applied locally, but the number of cases treated is so small that again we cannot draw definite conclusions.

G. A. G. MITCHELL.
Base Transfusion Unit, MEF. G. A. H. BUTTLE.

MINIATURE RADIOGRAPHY

SIR,—An important issue I raised at the meeting of the radiological section of the Royal Society of Medicine on Nov. 19 did not seem to be fully answered by any of the four opening speakers, although three of them admitted the importance and difficulty of my submission. Briefly the question was this.

The medical officer of a certain factory has complained that when the mass radiographic unit of the Ministry of Health visited the factory, the medical officer in charge of the unit erected an extraordinary barrier of professional secrecy, and refused to convey any information regarding the positive or suspect cases to the patients themselves. Worse however was the fact that he did not propose even to tell the factory medical officer when a case was positive. The factory medical officer points out to me that this is a bad policy and that he is under the same responsibility regarding medical secrecy as any other doctor. He or she is only entitled to convey information regarding disease in members of the factory to the managing director, or his nominee, where it is a matter that affects the health of the factory workers generally, or the individual's efficiency. Tuberculosis is a case in point, but it seems rather nonsensical to carry out mass radiography on a large number of employees if the factory medical officer is not to be in a position to advise employees in the light of the findings.

One of the opening speakers explained that any information about a positive case could only be conveyed to the patient's private doctor and that this decision had been reached after consultation with the Trades Union Congress. Further it was pointed out that if an employee in a factory was found to have pulmonary tuberculosis, and after being informed refused to receive treatment, then as the law stands we are powerless to enforce treatment. Thus if such an employee is working in a factory producing proprietary foodstuffs he can continue his work, while the factory medical officer is kept in ignorance of the facts, and perhaps his private doctor may decide to watch him rather than notify the case. Meantime the other factory workers and the general public are to suffer and possibly become infected from the food this tuberculous individual is handling. Surely something must be done about this.

It is satisfactory to note that at last instead of bringing the workers to the units the units are being taken to the workers, as I have advocated since 1939. Nevertheless, large numbers of stationary or static centres will have to be created for the other millions of the population who are not conveniently centralised in factories. This part of the scheme I feel will eventually evolve itself around a regional organisation with perhaps 8 regions to cover Britain and boards of experts (physicians and radiologists) for examining the miniature films attached to each region. The suggestion of training medical officers of health to "spot disease" on miniature films, like young boys train themselves to spot different types of aircraft, must sooner or later bring discredit to this important field of chest radiology destined to revolutionise social medicine.

The latest official figure of the number of cases examined per unit is 1500 a week, so that one unit working for 40 weeks can only cover 60,000 subjects in twelve months. At this lamentably slow rate it would require over 650 units to cover the population of Great Britain in a year. To examine Greater London with one unit I once over-optimistically indicated a term of 80 years, but this will now have to be extended to over 133 years!

London, W.1. NORMAN P. HENDERSON.

1. Albert, A. and Gledhill, W. *Lancet*, 1943, ii, 238; and *Pharm. J.* Sept. 4, 1943, p. 87.

POLYONYMY

SIR,—It is already difficult for the general physician or surgeon to keep pace with the discovery of therapeutic derivatives of moulds. It will be impossible if they receive multiple names. What just reason can there be for issuing patulin under the brand name of tercinin? Why should the prestige of a British product be halved by an alias?

CORYZA.

*** The brand name 'Tercinin' was applied to anhydro-3-hydroxymethylene-tetrahydro-γ-pyrone-2-carboxylic acid by the Therapeutic Research Corporation and registered by them when they undertook its manufacture. It seemed undesirable to adopt a trade name in the account of the collaborative research on this substance, and the chemical name was inconveniently long; a second, non-proprietary, name was therefore adopted. Multiple names might be avoided if anyone about to introduce a new drug which is likely to come into fairly general use would apply to the nomenclature committee of the British Pharmacopœia Commission for a name or approval of a name.—ED. L.

DOMESTIC SERVICE IN HOSPITALS

SIR,—Professor Nixon writes of hospitals situated in the centre of a city with all sorts of amusements near at hand. These are, of course, in a much happier position regarding domestic staff than are sanatoria isolated in the heart of the country. But at the Cheshire Joint Sanatorium, although the shortage has made relief for holidays and sickness none too easy, we have been lucky enough to keep a faithful skeleton staff together and so always managed to carry on. The staff social and athletic club provides opportunities for games (hockey,

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medical authorities welcomed this suggestion and decided, with my approval, to take Lord Dawson and Dr. Evans into consultation. The question of fees for the two consultants out of public funds had not yet been raised, so far as he was aware. No question of fees arose in the case of the prison medical authorities.

Cholera in Bengal

Replying to a question on the food situation in India, Mr. AMERY added: A serious outbreak of cholera in Bengal has followed upon the famine. During October deaths in the province from this disease averaged 5349 per week. In the first week of November they were 4464. Assistance in the provision of doctors and medical equipment is being provided by the Army and a mass inoculation campaign is being planned. Some drugs are being flown from this country.

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tennis, badminton), swimming (there is a pool in the grounds), dancing, shooting, amateur dramatics, concerts, cinema shows and language studies (refugee nurses have taught French and German). As members of the club, domestic staff, when off duty, have equal status with medical and nursing staff.

Since a scheme for the training of maids has been tried out at the sanatorium the junior domestic staff have been treated as domestic science students. A certificate of elementary domestic science training is awarded to those who satisfactorily complete a two years training and possessors of the certificate are eligible for promotion to the rank of assistant housekeeper. Assistant housekeepers receive a salary of £105 with full residential emoluments and enjoy the same off-duty privileges as staff nurses. All domestic staff wear a Ministry of Health Hospital Service badge.

Cheshire Joint Sanatorium, Market Drayton. MARIE A. SIMPSON, Matron.

MULTILINGUAL MEDICAL PHRASE-BOOK

SIR,—With reference to your peripatetic correspondent's suggestion in the *Lancet* on Nov. 13, I have already prepared a phrase-book on similar lines and the phrases have been translated through the kindness of foreign doctors into 26 languages. The cost of printing is estimated to be high on account of the numerous kinds of special type required; and I have so far been unsuccessful in finding anyone willing to make a grant towards the cost of publication. The text of my "Polyglot Medical Questionnaire" is specially devised for obtaining medical histories from patients who do not speak the same language. The system adopted for communication between patient and interrogator is quite simple and incidentally dispenses with the necessity for spoken words. By this means it should be possible for a doctor or nurse, with no knowledge of the patient's language, to obtain an adequate clinical history.

Liverpool. S. CHALMERS PARRY.

*** The Norwegian Red Cross have sent all the principal hospitals in Great Britain a questionnaire in Norwegian and English which enables Norwegian patients who cannot speak English to explain their complaints and needs.—ED. L.

EXOPHTHALMIC GOITRE AND PEPTIC ULCER

SIR,—In his interesting paper in your last issue, Dr. Halliday mentions peptic ulcer as associated with exophthalmic goitre and quotes A. T. M. Wilson to the effect that "exophthalmic goitre may precede the onset of peptic ulcer but apparently seldom follows it."

In my experience association of the two diseases is extremely uncommon, either as a simultaneous or sequent event. This, I think, is borne out by considerable clinical and experimental work summarised and supported by Louis and Wills (*Quart. J. Med.* 1937, **30**, 353) showing that most patients with thyrotoxicosis have achlorhydria or hypochlorhydria, although normal acidity may return after thyroidectomy. Furthermore Dr. Halliday's brief descriptions of the personalities underlying duodenal ulcer and exophthalmic goitre do not correspond very closely. The former is described as showing "a sustained relentless application associated with obsessional and compulsive drives" while the latter is "nervous, impatient, irritable, tending to violent emotions." Nevertheless it is gratifying to see increasing emphasis laid on the underlying constitution in diseases and in exophthalmic goitre in particular.

Department of Medicine, University of Cambridge. LAURENCE MARTIN.

Messrs. MAY and BAKER LTD. have introduced a new preparation of 3-amino-4-hydroxy phenylarsine oxide (arsphenoxide) for the treatment of syphilis and other infections susceptible to neoarsphenamine. This new product, 'Neo-Halarsine,' is arsphenoxide tartrate, and among advantages claimed for it are that the active material is a pure crystalline substance and that solutions can stand for at least 8 hours without discoloration or increase in toxicity. A preparation of arsphenoxide named 'Halarsol' was issued in 1930 by the same firm for the treatment of yaws.

Obituary

ERNEST CHARLES LINDSAY

CBE, B SC NZ, M B LOND., F R C S

Charles Lindsay, surgeon to the London Hospital, died suddenly on Oct. 23 from coronary thrombosis. He had returned to work after an almost fatal attack 18 months ago. Cheerful equanimity in the face of illness and its threats had long been one of his characteristics.

Fall, London

He was 60 years of age and the son of the Rev. George Lindsay of Christchurch, New Zealand. After taking a science degree at Otago he came to England for his medical course and qualified in 1909. A series of house appointments at the London Hospital followed; he became FRCS in 1912 and was surgical registrar at the hospital. After war employment in the RAMC as a surgical specialist, for which he was made CBE, he went back to the London where he became assistant in the surgical unit and was elected to the staff in 1920. He soon won recognition as a thoroughly capable general surgeon with good judgment and—as befitted a pupil of James Sherren—special knowledge of the upper abdomen. He wrote useful papers on pulmonary embolism and postoperative acidity and collaborated with the late W. S. Perrin in an important monograph on intusssusception. His patients recognised him as entirely trustworthy; his house-surgeons and dressers found him always helpful and kind; and his teaching was sound and clear. Former students will remember his stocky figure, his merry eye, and his tidy mind which could classify and tabulate neatly in a manner very useful to prospective examinees. He was himself an examiner at Cambridge and Belfast universities.

Mr. Lindsay gave long service to the Poplar Hospital and the Freemasons Hospital as well as to the London. In the intervals of a busy professional life he found time for music, gardening and golf. He married, in 1921, Mrs. Mae C. Davies, who survives him.

RICHARD KENNY LEVICK

M B CAMB, MRCP; CAPTAIN RAMC

Captain Richard Levick, who was killed in Italy during October at the age of 33, was younger son of the late Dr. G. K. Levick of Havant, and brother of Dr. P. K. Levick of Bungay. He was educated at Epsom College, Christ's College, Cambridge, and St. Bartholomew's Hospital. He took his degree in 1934 and after holding junior house-appointments at Bart's he spent eighteen months at the Norfolk and Norwich Hospital and six months at Addenbrooke's, where he came in contact with Professor Ryle and became an assistant in the department of medicine at the university. Then he worked for Dr. Russell Brain at Maida Vale, and took his MRCP. Later while at Great Ormond Street, he was awarded a studentship at Cambridge for two years, but the outbreak of war postponed this and he went back to Ormond Street as resident assistant physician until after the raids of 1940 when he was put in charge of the annexe at Hemel Hempstead. A friend writes:

Levick was at his best with children who took confidence at his friendly, serious and unaffected approach. During his years at the Hospital for Sick Children, he became more and more absorbed in his work, even to the exclusion of normal leisure but he was always grand at a party and was famous for his hearty laugh, and he was a mighty hitter on the golf course or tennis court. His outstanding traits were thoroughness and modesty. His case-taking was never hurried and his notes models of fullness and accuracy. Neither long lines of patients nor anxious assistants could shake him into a hasty decision: and in wards or outpatient department he could never be persuaded to watch the clock. Based

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on careful observation his judgment was sound but often more highly valued by his chiefs and colleagues than by himself.

In June, 1942, Levick received his commission with the RAMC and became physician to a casualty-clearing station. With his unit he landed in Sicily and later crossed to Italy where he was killed when the lorry in which he was travelling went over a cliff. He married in 1940 Miss Jessie Phillips, a ward sister at Great Ormond Street, and leaves her with a daughter.

ALAN GRAHAM PORTER

MB CAMB.; MAJOR RAMC

Major Alan Porter, who has been missing since September, is now reported to have been killed in action in the central Mediterranean area. He was born in 1915, the son of Dr. Alexander Porter of Dovercourt, Essex, and educated at St. Edmunds, Ware, and Caius College, Cambridge. He took honours in the natural sciences tripos in 1937 and went on to St. Thomas's where he won the Myers prize in psychology. Porter graduated MB in 1940 and returned to Cambridge as a house-physician at the emergency hospital. On joining the RAMC in 1941 he was attached to the field ambulance with which he remained till his death. For over a year he was adjutant and soon after he went abroad in 1942 he became company commander and this year he received his majority.

Nawrast, India

L. C. M. writes: "Alan Porter proved himself a keen and competent clinician, quick to seize upon an interesting point of any case and revelling in the uncommon ones. Two short publications on cases of chronic meningococcal septicæmia and paradoxical cerebral embolism reflected his clinical enthusiasm. Porter's promotion to the rank of major in a field ambulance came as no surprise to those who had worked with him and they will remember especially his cheery personality and never-failing sense of humour."

Dr. Porter married in 1938 Miss Olive Stanley, a graduate of Newnham College, and they had one daughter.

KENNETH PERCIVAL MORRISON

MB ST. AND.; CAPTAIN RAMC

THE death of Ken Morrison in West Africa came as a shock to his friends, for news from him was good and he had entered foreign service with characteristic zest. Ken was always rather shy and diffident, but among those he knew he expressed his well-considered opinions with freedom. Brought up in a home where internationalism was encouraged his outlook was broad, even in his early years at Madras College, St. Andrews. When his school days ended he shrank from the idea of anatomy and dissection, and for a year he studied engineering at University College, Dundee. But he soon realised his mistake and next year joined the faculty of medicine. He was an outstanding student and graduated in 1940 when still only twenty-three. After holding house jobs under Professor Patrick at Dundee Royal Infirmary and under Mr. Wilson Hey at the Manchester Royal Infirmary Morrison returned to Dundee to work with Professor Cappell in the department of pathology. In 1942 he joined the RAMC and was with an armoured guards division until he was wounded on Salisbury Plain in April, 1942. When he returned to duty, after a service pathology course, he was posted as pathologist first to the Orkney and Shetlands command and later to a general hospital in West Africa. He had an inquiring mind and was tireless in his search for an answer, and those who knew him best believed he was one of the "would have beens" of medicine. In 1941 he married Miss Mary Clark of Dundee who survives him. J. G.

Polyfoto

Public Health

Outwitting the Rat

A PRINCIPLE in the art of ratcatching is to lull the rats into a mistaken feeling of security. On Dec. 10 Greater London rats are being attacked in 3000 miles of sewers by the Ministry of Food and its infestation division. Since October the public have been asked not to kill rats but to notify the local authority whenever they saw one. Dr. M. T. Morgan,[1] medical officer of health to the Port of London, advocates a scheme of prebaiting, poisoning and postbaiting which aims at total elimination of rat colonies, not at "skimming the cream off a permanent establishment," and these methods are being followed. Baits containing no poison were put down on Dec. 7, 8 and 9 so that by the third day the rats were taking them confidently. On Dec. 10 poisoned baits are being used, and gassing may also be tried. In a test made at Kensington, poisoned bait was laid at one of the six entrances to the main sewer, and 6000 rats were killed at that point alone. In a scheme appropriate for docks, wharves, warehouses and farm premises, Dr. Morgan notes that zinc phosphide, arsenious oxide, barium carbonate and red squill—if you can get it—are reliable poisons. He finds that sausage rusk (the basic filling of sausages), whole wheat soaked for 24 hours and then drained, and bread mash are good baits; they should be inspected and renewed daily and notes should be kept of the amounts taken. On the day of attack all unpoisoned baits are cleared away, and poisoned baits are put down. The kill is estimated by postbaiting. About a week after the poisoning the old sites are baited again with unpoisoned food of a different type from that already used; rats are suspicious of bait which they associate with danger. If there is any taken, the new bait is poisoned after a day or two with a different poison.

Infectious Disease in England and Wales

WEEK ENDED NOV. 27

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 3157; whooping-cough, 1800; diphtheria, 732; paratyphoid, 2; typhoid, 0; measles (excluding rubella), 518; pneumonia (primary or influenzal), 1647 (last week 981); puerperal pyrexia, 166; cerebrospinal fever, 43; poliomyelitis, 13; polio-encephalitis, 1; encephalitis lethargica, 4; dysentery, 147; ophthalmia neonatorum, 75. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Nov. 24 was 1973. During the previous week the following cases were admitted: scarlet fever, 223; diphtheria, 47; measles, 17; whooping-cough, 49.

Deaths.—In 126 great towns there were no deaths from enteric fevers or measles, 5 (0) from scarlet fever, 16 (3) from whooping-cough, 15 (1) from diphtheria, 39 (5) from diarrhœa and enteritis under two years, and 375 (29) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 191 (corresponding to a rate of 33 per thousand total births), including 18 in London.

Influenza

The number of deaths in the great towns from influenza has risen steeply during the last three weeks. The returns for Nov. 20 showed 106; for Nov. 13, 46; for Nov. 6, 31. Of the 375 deaths reported for Nov. 27 there were 71 in Greater London but no town in the south-eastern area had more than 4 fatal cases, with the exception of Oxford (6). In the northern area there were 172 deaths (44 in Manchester, 17 in Bradford, 11 in Liverpool and 10 in Bolton) and the Midland area had 81 (20 in Birmingham, 18 in Bristol and 11 in Nottingham).

Appointments

MACBRIDE, H. J., MD GLASG.: psychiatrist to the Battersea General Hospital.

PANKHURST, J. H. F., MD, B HYG. DURH., DPH: examining factory surgeon for Boston, Lincs.

1. *Monthly Bulletin of Ministry of Health and Emergency Public Health Laboratory Service*, November, 1943, p. 116.

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Notes and News

FAMINE

THIS little book[1] is based upon the experiences of the Quaker relief unit working in Buzuluk during the Russian famine of 1921–1922. Buzuluk is about 100 miles east of Kuibishev, and before 1921 was a town of some 30,000 inhabitants and a centre of the grain trade. In 1921 it became the site of an appalling famine, and was chosen by the Society of Friends for their relief operations. To say that this book is good is understating the case. The writing is quite dispassionate, and it is packed full of practical experiences, which may well prove to be invaluable to other relief expeditions likely to be setting out from this country and America within the next 12 to 18 months. Only a few of the points can be mentioned. The dangers of centralising relief operations are explained: it led to such an influx of starving populations from the rural areas that the centres were overwhelmed. The rigid discipline required of relief workers is emphasised. It is no good giving away food indiscriminately. It is useless to feed anyone out of a compassionate impulse. People should only be fed who can go on being fed, and who are likely to be useful members of society if they survive. It is useless to try to save all the children at the expense of the young adults. First, last, and all the time, the personnel of the relief units must be well fed, well clothed, and well cared for. The importance attributed to cereals in famine relief is an interesting point. Every page contains a valuable hint for a future expedition, whether it be a mistake, frankly admitted, or an arrangement, mentioned in passing, which made all the difference between success and failure.

Royal College of Surgeons of England

The council has decided to proceed without delay to make an appointment to the chair of human and comparative pathology instituted under the gift made to the college by Mr. W. H. Collins. A board of advisors has been appointed, consisting of six members of the council and the president of the Royal Society, the secretary of the Medical Research Council, the acting regius professor of physic in the University of Cambridge, and Prof. J. Shaw Dunn of Glasgow. Details of the appointment will be announced soon.

Royal Society of Medicine

A meeting of the section of psychiatry will be held on Tuesday, Dec. 14, at 2.30 PM, when Dr. Joshua Bierer will read a paper on a new form of group psychotherapy. On Dec. 15, at 2.15 PM, at the section of comparative medicine there will be further discussion on the limitations and uses of the comparative method in medicine. Mr. M. A. C. Hinton, FRS, and Dr. H. Grüneberg will speak on animal ecology and genetics respectively. On Dec. 16, at 3.30 PM, there will be a joint meeting of the sections of dermatology and epidemiology and State medicine. Dr. F. S. Airey, Dr. Arthur Burrows, Sir Henry Gauvain and Dr. Fredk. Heaf will open a discussion on the organisation of the treatment of lupus vulgaris.

Medical Society of London

On Monday, Dec. 13, at 4.30 PM, at 11, Chandos Street, W.1, Dr. A. L. K. Rankin will read a paper on diphtheria, Dr. R. E. Smith on mumps, and Dr. Norman Begg on chickenpox.

British Institute of Radiology

A meeting of medical members will be held on Friday, Dec. 17, at 2.30 PM, at 32, Welbeck Street, London, W.1. On Dec. 18, at the same hour, Dr. F. H. Kemp will speak on chronic intussusception in children, and Mr. G. L. Rogers, PH D, on instantaneous stereography.

Medical Casualties

Lieut.-Colonel M. J. Kohane, MC, LRCPI, RAMC, and Surgeon Lieut.-Commander S. W. Maxwell, MB LOND., RNVR, have been posted as wounded.

BLACKCURRANT puree and syrup are now again on sale at retail chemists for children up to 16, invalids and others in need of extra vitamin C.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

1. Famine (Quaker Work in Russia 1921–23), by Michael Asquith, with foreword by Dr. Melville Mackenzie. (Oxford Univ. Press. Pp. 70. 2s.)

Population Problems

At a meeting of the Eugenics Society on Tuesday, Dec. 14, at 5 PM, at the rooms of the Royal Society, Burlington House, Piccadilly, London, W.1, Dr. J. A. Fraser Roberts will discuss population problems in the light of differential fertility.

Faculty of Radiologists

At the recent examination for the fellowship F. M. Abeles and W. Tennent were successful.

Society of Chemical Industry

At a meeting of the agriculture group on Tuesday, Dec. 14, at 4 PM, at Burlington House, Piccadilly, London, W.1, Mr. S. J. Watson, director of research at Jealotts Hill station, will speak on livestock deficiency diseases and their treatment.

National Ophthalmic Treatment

From Jan. 1 the board's fee for a medical eye examination to all insured persons will be 15s. The service will still be open to others whose family income does not exceed £250 a year, at the old fee of 10s. 6d. and the cost of glasses will remain as at present.

Ethical Pharmaceuticals Association

The following officers have been elected: chairman, Mr. G. L. Cooper; vice-chairman, Mr. C. W. S. Taylor; members of the executive committee, Mr. J. Angus (Bengue), Mr. R. F. Edkins (Organon), Mr. A. C. Henry (Bayer), Mr. W. Beckley (Zimmerman), Mr. H. R. Napp (Napp).

Lectures on Delinquency

On March 8, at 2.30 PM, Dr. Kate Friedlander will give the first of twelve lectures on the Freudian theory of delinquency, and on Jan. 14, at 6.30 PM, Mr. H. J. Jacoby will give the first of six lectures on the handwriting of delinquents. Tickets from the secretary at the Institute for the Scientific Treatment of Delinquency, 17, Manchester Street, London, W.1, where the lectures will be given.

MOH School Medical Group

At a meeting held at Derby on Dec. 3 it was unanimously decided to revive this group and a temporary committee was formed. All interested, whether or not members of the Society of MOH's, are asked to communicate with Dr. A. A. E. Newth, 28, Chaucer Street, Nottingham.

Births, Marriages and Deaths

BIRTHS

DURBIN.—On Nov. 28, at Byfleet, the wife of Mr. F. C. Durbin, FRCS—a daughter.

EDWARDS.—On Nov. 30, at Bournemouth, the wife of Squadron-Leader A. Glyn Edwards, MB—a daughter.

KENNETT.—On Nov. 25, in Edinburgh, the wife of Surgeon Lieutenant A. W. Kennett, RNVR—a daughter.

MACFARLANE.—On Nov. 29, at Oxford, the wife of Dr. R. G. Macfarlane—a son.

PAGE.—On Nov. 27, at Doncaster, the wife of Dr. Lawrence Page, RAF—a son.

RILEY.—On Nov. 25, at Broadstairs, the wife of Dr. Ronald Riley—a son.

RYAN.—On Nov. 26, at Windsor, the wife of Major Charles Ryan, RAMC (missing believed killed)—a daughter.

SCORER.—On Nov. 29, in London, the wife of Surgeon Lieutenant C. G. Scorer, MBE, RNVR—a daughter.

WARRACK.—On Nov. 28, at Edinburgh, the wife of Lieut.-Colonel G. M. Warrack, RAMC—a daughter.

WILSON.—On Aug. 5, the wife of Dr. H. T. H. Wilson of Mbeya, Tanganyika Territory—a daughter.

MARRIAGES

TRODDYN—SQUANCE.—On Dec. 1, at South Shields, Terence Henry Troddyn, MB, to Mary Elizabeth Squance.

WALFORD—AUERBACH.—On Oct. 25, abroad, Peter Ambrose Walford, MB, RAMC, to Nina Auerbach, MD, of the Public Health Department, Haifa.

DEATHS

AIR.—On Nov. 28, at South Norwood, Samuel Henry Cummings Air, MB LOND., aged 64.

BAYLOR.—On Dec. 1, Edward Arthur Crampton Baylor, MD DUBL. aged 81.

BOND.—On Dec. 1, at Westcliff, Essex, Laurence Temple Bond, MB CAMB.

GUBBIN.—On Nov. 28, at Crewkerne, Somerset, George Frederick Gubbin, LRCP, DPH, lieut.-colonel RAMC retd., aged 86.

HOGGAN.—On Dec. 4, at Liberton, Edinburgh, Robert Hoggan, MB EDIN., JP.

MCLANNAHAN.—On Nov. 28, at Salcombe, Devon, James Gunn McLannahan, LRCP, formerly of Stonehouse, Glos.

RUDKIN.—On Nov. 30, at Fleet, Hants, Gordon Wilfrid Ritchie Rudkin, MC, MB LOND., DPH.

WATERS.—On Nov. 29, at Stone, Dartford, George William Bennett Waters, MRCS.

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HEALTH OF HOSPITAL NURSES*

DONALD M. COURT, M B BIRM, M R C P
ASSISTANT PHYSICIAN, EMS

THERE are about 270,000 nurses in England and Wales and at least 11,000 more are required by hospital authorities to meet existing needs (see *Lancet*, 1943, i, 507). Health is rightly regarded as one index of living conditions, and its importance to the nurse and her profession, the patient, the hospital authorities and the community is self-evident. It is surprising therefore that this subject has been so neglected by our medical and nursing professions. In the past 5 years I found only 60 articles dealing with this subject in medical journals, and only 3 of these were by British authors. During the same period four times as many papers appeared on such a socially unimportant disease as diabetes insipidus. In America much work has been done in isolated hospitals, notably sanatoria, but it was not until 1938 that a comprehensive survey was made, by the American Hospital Association and others.

This paper deals with the health of nurses with special reference to the staff of an EMS sector hospital. This did not exist before the war, so that stability in conditions and personnel has still to be achieved. The numbers under review are small and the liability to statistical error proportionately great. Any conclusions will naturally be tentative and require modification in the light of data from larger groups observed for longer periods. Yet in spite of these limitations, the special importance of the subject at the present time and the absence of more reliable information from other sources in this country seemed to warrant a preliminary report.

THE PRESENT PLAN

I examine the nurses on entering the hospital or training school and record the facts on a standard form. Radiograms of the chest are taken in all cases, together with films of other systems as required. Further examinations and treatment of the teeth, ears, feet, &c., are carried out by the special departments concerned. The heart is screened in all cases where a murmur is present. The urine is examined microscopically wherever a history of scarlet fever, renal disease or urinary symptoms is given. Complete Mantoux and Schick tests are carried out on entry.

In case of illness, a sick bay of 30 beds is available, and all nurses are encouraged to accept treatment there. So far only half have done so, the remainder being treated by their panel doctors. Those accepting resident treatment are first seen by the medical superintendent, who either deals with them himself or refers them to the senior physician or surgeon. Convalescence can be taken at home or at the hospital convalescent home.

The non-resident group send in sickness certificates if their illness lasts more than 3 days, and continue to do so weekly until they return to duty. Sickness absence of less than 3 days has been included in the present survey though the diagnosis was of necessity made by the patient. It accounted for 6% of the total time lost, distributed between "bilious attacks" and other conditions. Notification as described has resulted in a measure of uncertainty both in diagnosis and control, and an attempt is being made to strengthen this weak link in the chain of supervision by writing to the doctor of any nurse who is absent for more than a week asking him to amplify the information on his certificate and give a provisional prognosis. This letter is, of course, only sent with the nurse's consent. On her return to duty she is asked to see the senior physician, who makes as full an examination as he thinks necessary.

TABLE I—PERCENTAGE INCIDENCE OF FINDINGS AT FIRST EXAMINATION OF 385 NURSES

—	Trained	Student	Assistant	Auxiliary
No. examined ..	76	96	65	148
(A) HISTORY (%)				
Measles	63	77	54	71
Pertussis	29	24	16	33
Scarlet fever	21	11	10	16
Diphtheria	6	4	6	7
Juvenile rheumatism ..	3	1	1	2
Otitis media	8	2	0	6
Recurrent sore throats ..	5	9	16	11
Tonsillectomy	21	31	28	33
Reason given	4	6	13	8
Asthma	0	1	0	2
Appendicectomy	17	12·5	13·5	10
(B) ON EXAMINATION (%)				
Defective vision	28	38	21	27
Teeth: Very good ..	17	40	26	38
Satisfactory ..	60	44	46	40
Poor	16	13	15	19
Complete dentures	7	3	13	3
Heart: structural disease	1	1	0	2
Menstrual pain: Mild	17	15	19	24
Severe ..	2	5	4	12
None	81	80	77	64
Varicose veins	5	6	6	10
Foot defects	7	2	6	7
Acne vulgaris	2	14	6	9
Emotional instability ..	0	2	4	2
Raised blood-pressure ..	3	0	2	1
Active tuberculosis ..	0	0	0	0
Radiogram of chest—				
Doubtful shadows ..	4	0	0	2

TABLE II—NUMBERS IN DIFFERENT AGE-GROUPS

Age-group (years)	Trained	Student	Assistant	Auxiliary
15–20 ..	0	24	6	18
20–25 ..	14	25	14	17
25–30 ..	16	5	13	8
30–35 ..	12	1	13	7
35–40 ..	12	0	4	5
40–45 ..	6	0	4	3

HEALTH AND SICKNESS 1942

Building the hospital did not begin until 1940 and has only just been completed. The expansion and fluctuation of the staff, inevitable during such a period of rapid growth, makes accurate statistical analysis very difficult. It will be noted that the number of nurses initially examined (table I) is larger than in the sickness survey (table III). This is particularly so among the auxiliaries, many of whom left after their 14 days' intensive training for service in other hospitals. A training school was not established until the end of 1941, so that no student nurses figure in the analysis for that year. In the sickness survey only nurses present for 6 months or longer have been included. This, though an arbitrary selection, only eliminated a small minority of nurses who were present for very short periods. No other selection has taken place, though the 1942 sickness figures are weighted by 4 nurses who together had 600 days' illness. The four types of staff—trained, student, assistant and auxiliary—have in part been analysed separately. The first two constitute established professional groups, "assistants" are about to be recognised, while auxiliaries represent the source of the many recruits which the future will demand.

INITIAL EXAMINATION

The incidence of abnormalities revealed in the history and examination is set out in table I and the age-distribution of the staff is given in table II.

The similarity in the incidence of "fevers" in all groups shows that at least in this respect they are comparable, though the continued presence of diphtheria should be remedied in the near future. There was a high tonsillectomy rate, especially in the younger age-groups, compared with the incidence of recurrent sore throats. The "slaughter of the innocents" still continues, further emphasising Glover's suggestion that in the main tonsils should be removed from the vocabulary and not from the pharynx.

Normal vision was taken as 6/6 or less (Snellen); 32% of visual defects were uncorrected or inadequately corrected when first seen. The criteria for dental inadequacy were entirely arbitrary because no official standards have been established, though they correspond closely to the grouping adopted by Morris (1941). "Very good" means that all teeth were present and free from untreated disease; "satisfactory" allows up

* Read at a meeting of the Middlesex County Medical Society on April 20.

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TABLE III—SICKNESS RECORD OF NURSES OVER 2 YEARS

Analysed according to: (A) residence or non-residence; and (B) grade of nurse

—	1941				1942			
	Nurses	Total sickness (days)	Av. sickness per head (days)	No sickness (%)	Nurses	Total sickness (days)	Av. sickness per head (days)	No sickness (%)
(A)								
Resident	30	1704	7·6	..	111	3259	12·4	..
Non-resident	98		15	..	117		15·9	..
(B)								
Trained	50	..	5·2	44	60	..	6·9	42
Student	0	..	..	..	56	..	11·6	37
Assistant	52	..	22·8	8	54	..	17·7	13
Auxiliary	26	..	9·8	23	58	..	16	22

to 4 teeth missing, treated caries in several and early caries in 1 or 2; "poor" implies a dental state worse than this with many posterior teeth missing, caries in more than 3 teeth, the whole often associated with gingivitis. The higher percentage of very good teeth in the younger age-groups suggests that the better dental attention of recent years is bearing some fruit. The proportion of poor teeth, especially among the auxiliaries, shows that there is still much to be done, and the number of nurses with back teeth missing who were without dentures was particularly striking.

The figures for varicose veins do not suggest that nursing predisposes to their development. The incidence of foot defects is probably too low and needs correction by figures obtained for a similar group examined by a specialist. The acne vulgaris was mild in all but 2 cases, but it is an unpleasant condition and might well be taken more seriously. In one hospital in South Africa no nurse with acne is allowed to work in a surgical ward (Hugo 1939).

The degree of emotional stability cannot be fairly judged at the first examination. Yet such judgment is important and often neglected. The need for a period of careful observation may be evident at the first meeting, and it is significant that of the cases noted under this heading all except one subsequently left.

The main difficulty of such examinations is in recognising early defects. In this respect one's previous training is inadequate, providing a conception of medicine overshadowed by established and often irreversible disease. It is hardly less difficult to decide on what grounds a girl should be rejected altogether. To certify that a person is free from any physical and mental defect which may lead to retirement before the prescribed age is a responsible undertaking. Accurate guidance in this

TABLE IV—DURATION OF SICKNESS IN EACH GRADE

Grade	No. in group	Percentage of nurses sick for various periods (days)							
		1	2	3–7	8–14	15–21	22–28	29–84	84+
Trained	58	25	20	20	10	10	10	2·5	2·5
Student	63	3	15	24	10	14	6	28	..
Assistant	87	18	10	27	13	7	5	17	3
Auxiliary	78	11	8	24	18	11	6	17	5

field can only be reached by wide surveys for a sufficiently long period, and so far no such data are available.

DETAILS OF SICKNESS

The main points to note (table III) are a greater incidence of sickness among students than trained staff and an even greater incidence among the assistants. With small groups one or two long illnesses might account for these differences, but the distribution of sickness for different lengths of time (table IV) confirms the reality of the differences. Even allowing for one very long illness among the assistant nurses in 1942, their level of sickness in both years is much higher than that of the first two groups. The auxiliaries show a difference in the two years, though the size and inequality in numbers make it unwise to draw any definite conclusions. In the second year their sickness level more closely resembles that of the assistants than of the first two groups. The difference between resident and non-resident groups in 1941 was not maintained in 1942 when the groups were numerically more comparable. The American survey gave a similar sickness-rate for trained staff, but lower figures for the students, ranging from 5·9 to 10·6 days. If the American figures (table V) apply to this country, and they probably do, nursing would seem to entail a greater risk of disease than other professions, though the sickness "threshold" must vary widely. Also when occupational risk is not great and supervision good, as in the "large store," the sickness-rate reaches a very low figure. In nursing it is clearly a question of greater occupational risk against better health supervision, though the latter unfortunately is still only potential in many hospitals, and where health

TABLE V—SICKNESS RECORDS IN PRESENT SURVEY COMPARED WITH RECORDS OF AMERICAN NURSES AND OTHER GROUPS

Group	No. of persons	Date	Age (yr.)	Av. annual sickness per person (days)
Nurses				
Present survey—				
Trained	60	1942	21–45	6·9
Student	56	1942	17–30	11·6
American survey (trained)	8794	1937–38	21–35	6·6
	17,364	1937–38	18–25	8·3
Other occupations				
English insured population, 1933*	16,000,000	1933	..	11·2
Staff of large store*	1000	5 years	..	4·4
America—				
College students	1258	1925–26	17–20	1·8
Teachers	3240	1934–35	20–60	3·5
Domestic servants	..	1932	..	10·8

* Cited from Vernon (1939).

supervision is good nurses are more readily kept away from the wards.

Turning to the causes of sickness (table VI), we find as expected *respiratory infections* (colds, nasal sinusitis, tonsillitis, bronchitis and influenza) easily first both in days lost and number of staff involved. But this is more than an administrative problem; it may be a source of inconvenience and danger to the patient. The following incidents in the current life of the hospital illustrate this fact.

A house-surgeon with a mild cold assisted in the operating-theatre; β hæmolytic streptococci were later isolated from his nose and he was sent off duty. One of the patients operated on developed scarlet fever and another streptococcal peritonitis from which she subsequently died.

A nurse on duty in a small isolation unit developed a sharp upper respiratory infection. After 2 days she went off duty and was away for 3 weeks. Seven patients who were expecting to leave the hospital within the next few days developed a similar clinical picture 48 hours later, which added 10 days to each one's stay in hospital.

In this group of disorders it is not too much to say that familiarity has bred inertia. Serious preventive measures on a large scale have not been taken, though if these figures are true for most hospitals the need is real and urgent.

Skin diseases include boils, impetigo and scabies in that order.

In this section a reference to erythema nodosum is required; 1941 provided 1 case forming part of a primary tuberculous complex. In 1942 there were 4 cases. Only 1 of these was associated unmistakably with primary tuberculosis, though the clinical course in 2 others was essentially similar. The last had a negative Mantoux reaction and was associated with a streptococcal infection of the hand. It is difficult to escape

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the conclusion that the opening of two wards for tuberculous patients in December, 1941, was related to the increased incidence, especially as 3 of the nurses developed the erythema at the end of 3 months' duty on these wards. Unfortunately, routine Mantoux testing, though intended from the start, had not been carried out and the initial reaction of these nurses is unknown. Although erythema nodosum has several causes, its main value lies in drawing attention to a possible primary tuberculous infection at a very early stage.

The *accidents* were minor ones except for 2 cases of fracture. In the main they were not sustained while on duty, though the black-out, both inside and outside the hospital, was a significant factor.

The term *debility* occurred exclusively in the certificates of those treated by their panel doctors.

The term *bilious* accounted for 32 single days and seemed to cover a multitude of sins.

The causes of sickness in each group are shown in table VII. The better health of the trained staff is evident on almost every count except respiratory infections where they gave rather higher figures than the students. These were mainly colds, and the nurse or sister was away for only a short period. There is probably a tendency among this group, owing to their greater responsibilities, to ignore illness which they consider trifling and to stay on duty when they should really be at home. The poorer health of the assistants and auxiliaries is well shown. Analysis of seasonal variations showed the expected rise during the winter months almost entirely due to respiratory infections. No local figures were obtained to show the variation with age, marriage, night duty or service in different departments of the hospital.

The American figures show a much higher incidence of sickness among students in the children's wards and the infectious fever units.

The main problem arising out of this survey of sickness in a sector hospital concerns the group variation. Only tentative explanations are permissible. The trained staff are seasoned troops and have the most satisfactory

TABLE VI—DISTRIBUTION OF SICKNESS IN PRESENT SURVEY

Disease	Days lost		Staff ill (%)	
	1941	1942	1941	1942
All	1704	3259	..	..
Respiratory infections	637	1163	38	45
Skin disorders	194	231	6	5
Peptic ulcer	140	105	3	0·4
Accidents	101	179	5	6
Debility	98	71	3·7	1·3
Rheumatism	89	43	3·7	1·3
Urinary infections ..	75	63	3·7	1·8
Septic fingers	71	210	5	8
Primary tubercle	64	206	0·8	0·9
Neurosis	63	50	0·8	0·9
Gastro-enteritis	57	285	3	9
Other disorders	130	250	27·3	20·4

economic position. The students are susceptible young adults, many of them entering resident life for the first time, and all of them making their first contact with concentrated disease. Branson (1933) suggests that the first year may be as prolific in illness as the three subsequent years together.

The high incidence of sickness among the assistants and auxiliaries may be local and transient. If it proves real, several possible factors are involved. First and foremost, a less satisfactory position; this is most evident in the auxiliaries. Those who live outside the hospital receive £2 2*s.* 6*d.* a week with no working meals or war bonus. Other factors which affect the assistants are a high proportion of married women with home responsibilities in addition to the hospital work, and a lower level of intelligence. These nurses are essentially women who, whatever their practical capacity, have been unable to reach the standard demanded by the State examinations in nursing. Intelligence testing in all groups might give interesting results.

In the auxiliaries we probably have a less healthy group from the start (table I). Their age corresponds closely with that of the students (table II), so that first contact with concentrated disease is also a factor. Finally, for many it is a war-time job, and in this connexion the observation of Millais Culpin (1936), that where 40% or less of the workers are satisfied with their work the sickness-rates are high, is of interest.

With regard to the Mantoux test (table VIII), the proportion of negative reactors is low compared with other surveys. This is accounted for, at least in part, by the fact that the majority had been in hospital for some time before testing was carried out. A nurses'

TABLE VII—PERCENTAGE ILL IN EACH STAFF GROUP, 1942

Disease	Trained	Student	Assistant	Auxiliary
Respiratory infections	30	23	68	57
Gastro-enteritis	3	13	9	15
Skin disorders	1·6	9	10	1·6
Septic fingers	1·6	7	13	9
Accidents	6	9	4	3·5
Peptic ulcers	1·6	..	..	..
Debility	1·6	..	4	..
Urinary infections ..	3	..	3·7	..
Neurosis	..	..	1·8	1·7
Rheumatism	..	..	5	..
Tuberculosis—				
Primary	..	1·8	..	..
Bronchogenic	1·6	..	..	..
Bilious	10	1·8	20	3

training school has now been established in the hospital and the figures for new students in the coming years will be of greater value.

Routine hæmoglobin estimations, though considered desirable, were not carried out for war-time reasons. The level below which anæmia can be said to exist has not been drawn with certainty. If we take the current figure of 80% hæmoglobin as the dividing line, in the small sample of 52 nurses taken for blood-donation purposes only 2% were below this level.

Hb. % ..	70–75	75–80	80–85	85–90	90–95
Nurses ..	1	0	4	10	9
Hb. % ..	95–100	100–105	105–110	110–115	115–120
Nurses ..	11	7	8	0	2

Attention has recently been focused on this subject by Lucy Wills and her co-workers (1942). They appear to show that nurses in sector hospitals have lower hæmoglobin levels (84·1%) than those working in London (90·6%). This was associated with an inadequate dietary—the inadequacy being not only in iron but also in total calories and proteins. A recent critical review of this work suggests that "these women were not getting as satisfactory a diet as it is possible to get in war-time Britain, and there is evidence that these conditions are not confined to one particular sector" (*Brit. med. J.* 1943, i, 449). It is clear that routine hæmoglobin estimations on large numbers of nurses are desirable, followed by investigation of the dietetic and

TABLE VIII—RESULTS OF MANTOUX AND SCHICK TESTING

Test	Nurses tested	Positive		Negative	
		No.	%	No.	%
Mantoux 1:10,000→1:100	196	185	94·4	11	5·6
Schick	202	104	51	98	49
Trained	50	19	38	31	62
Student	92	53	56	39	44
Assistant .. .. }	60	32	53	28	47
Auxiliary .. .. }					
Age (yr.) 15–20	19	13	68	6	32
Age (yr.) 20–30	130	73	56	57	44
Age (yr.) 30+	53	18	34	35	66

other relevant factors if an appreciable incidence of anæmia is found.

CONCLUSIONS AND SUGGESTIONS

The health of a group is the resultant of all the constitutional and environmental factors involved. The health of nurses is probably less satisfactory than that of women in other professions. To establish this requires a detailed survey of large numbers over several years. Such essential data, which must include details of accommodation, dietary and recreational facilities, are not at present available for this country. In view of the greater occupational risks entailed by a nursing career, all possible measures must be taken by hospitals

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to promote the highest level of health. These should include ample accommodation, a liberal diet, adequate facilities for mental and physical recreation, and preventive leave of absence where impending breakdown is suspected.

Respiratory infections are the greatest single cause of ill health in the group. A serious experimental study of practical preventive measures is urgently needed and the resulting recommendations, however irksome, should be endorsed. Developments along this line in American sanatoria may prove a helpful guide to the kind of action required.

To carry these principles into effect, a comprehensive health programme should exist in all hospitals. From the experience of this hospital, the most satisfactory body to direct this is a team consisting of the senior medical administrator, the matron and the senior physician and surgeon—to which could profitably be added a nurses' representative and a health supervisor and keeper of records. The essentials of such a scheme are:

1. A detailed initial examination including routine Mantoux and Schick testing, hæmoglobin estimations and X-ray examination of chest. These should be followed by immunisation where necessary.

2. Re-examination at regular intervals—the average period being 12 months, with shorter intervals in special cases. In many cases, if not in all, a probationary period of 3 months before acceptance is desirable.

3. Adequate facilities for treatment of all sickness within the hospital.

4. A frank explanation of the nature and purpose of these health measures to the nurse on admission and as occasion demands.

5. A uniform record card for the whole region suitable for statistical purposes.

This health programme to be fully effective should include all hospital personnel.

My thanks are due to the medical director, the matron and the senior pathologist for their help.

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PRESSURE PALSY IN THE PARALYSED LIMB *

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FOR a long time surgeons have known that the lateral popliteal nerve is vulnerable as it winds around the neck of the fibula to gain the anterior aspect of the leg, and that it may be damaged by local pressure even when this is maintained for relatively short periods. In surgical practice, these pressure palsies, resulting in foot-drop and anæsthesia over the dorsum of the foot and sometimes over the outer aspect of the leg, have been seen after the application of a badly moulded plaster or plaster bed, or after manual pressure on the plaster, while it is still soft, during the manipulation of a fractured leg. Tight bandaging around the knee after operations on that joint, the slipping of a badly applied wooden back splint, or unrelieved pressure of the leg against the outer bar of a Thomas splint are other well-known causes. Instances such as these are far commoner than is usually supposed, and partial lesions of the nerve will often be found if carefully looked for.

Seeing how easily the complication may happen in the otherwise normal limb, it is clear that it would the more readily follow application of splints and plaster to the paralysed limb of hemiplegia or paraplegia, and such is found to be the case. There are, however, some additional factors to consider. If the flaccid limb is allowed to adopt its natural position, it lies everted with the outer side of the knee resting on the bed; in narrow beds and stretchers this usually means the hard edge, and if the limb is allowed to remain for a time in this position, a pressure palsy of the nerve may result. It must also be remembered that the paralysed limb wastes, thereby rendering the nerve more susceptible to external pressure.

CASE 1.—A private, aged 36, was injured in Libya on Nov. 29, 1941. While sheltering under his truck from a dive-bombing attack, he was struck in the back by the axle of another truck. He sustained a severe crush fracture of L.1 with immediate onset of flaccid paralysis of both legs and retention of urine. In mid-January, 1942, plaster back splints were applied to both legs and were extended up to the knees. Within a week a plaster sore had developed over the head of the left fibula. A little later a similar one appeared on the right side and they both became progressively worse.

He was admitted to a military hospital on Oct. 1, 1942, with a large ulcer on each side which had exposed the head of the fibula. These healed slowly leaving depressed scars; from their position the lateral popliteal nerves must have been involved and were buried in dense scar tissue. For the eight months during which he was under observation there was gradual improvement in the thigh muscles but no vestige of returning function below the knees.

DIAGNOSIS

Before giving further details of this case, it will be convenient to describe the methods of investigation employed in these cases. To demonstrate the existence of a peripheral nerve lesion in a limb already paralysed by a more central lesion, a combination of three methods has been found applicable: clinical examination, electromyography and the sweating reaction.

Clinical examination.—The presence of a sensory loss over the limb corresponding to the distribution of the nerve or its branches, or the detection of flaccidity in the peroneal and anterior tibial muscle groups in association with spasticity of the surrounding muscles, is, of course, diagnostic. In the main, however, the examination can only suggest the possibility of a peripheral nerve palsy. The lesion may be suspected in the presence of one of the following signs: continued absence of power in the peroneal and anterior tibial muscle groups of a limb otherwise recovering; a disproportionate rate of wasting of these muscles in the paralysed limb; failure of these muscles to participate in the mass reflex in a case of paraplegia; failure to elicit this reflex by stimulating the dorsum of the foot or outer side of the leg. The presence of a plaster sore or bed-sore over the head of the fibula, as in the case described above, is always highly suggestive. Nevertheless it is usually impossible to dogmatise on the clinical examination alone, and the proof lies in the results of the sweating reaction and electromyogram.

Electromyography.—The recent investigations of Weddell, Feinstein and Pattle[2] into the electrical activity of voluntary muscles and the changes produced by denervation have immediate clinical application. The presence of fibrillation action potentials is evidence of a lower motor neurone denervation of the muscle concerned; it does not occur in an upper motor neurone lesion. Consequently electromyography in the group of cases now under consideration has proved of the utmost value in establishing the existence of these lateral popliteal palsies.

Sweating reaction.—Guttmann[3] has demonstrated the sweating disturbances which occur in hemiplegia, paraplegia and peripheral nerve lesions. With the quinizarin method, a peripheral nerve lesion is shown by the absence of sweating over the distribution of the nerve. In these particular cases, the sweating disturbance is seen in marked contrast to the central reaction elsewhere. In cauda equina lesions the test becomes diagnostic, for where such a lesion is complete, neither neurological examination nor electromyography will determine the actual level of the injury. The sweating test, however, will immediately differentiate a spinal from a peripheral lesion since at the cauda equina level

* A paper read to the Society of British Neurological Surgeons in May, 1943.

2. Weddell, G., Feinstein, B. and Pattle, R. E. *Lancet*, 1943, i, 236.
3. Guttmann, L. *Z. ges. Neurol. Psychiat.* 1931, 135, 1; *J. Neurol. Psychiat.* 1940, 3, 197; *Proc. R. Soc. Med.* 1941, 35, 77.

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there are no sympathetic fibres; these having left the cord higher up are now distributed with the peripheral nerves. Consequently, the picture in a cauda equina lesion is that of normal or even increased sweating of the limb, and a superimposed peripheral lesion with a resultant area of anhydrosis is readily seen.

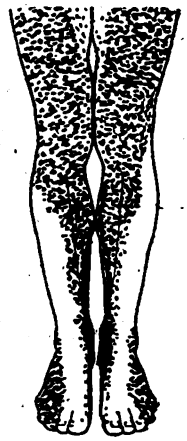

Fig. 1—Case 1. Anhydrosis over the distribution of both popliteal nerves.

CASE-RECORDS

Using these methods together, it has been possible to demonstrate lateral popliteal nerve palsies in some cases of hemiplegia and paraplegia resulting from injury or gunshot wound. A fuller consideration of some of these case-records will bring out these points.

CASE 1 (*continued*).—In this case of a cauda equina lesion, the possibility of a lateral popliteal palsy was suggested by a large pressure sore over the head of each fibula. Electromyography on Feb. 4, 1943, showed a complete lower motor neurone denervation below the knees as would be expected. A sweating test on Feb. 6 showed an area of anhydrosis over the legs limited to the distribution of the lateral popliteal nerves (fig. 1).

Here the sweating test was diagnostic and the cause of the lesion was pressure by plaster back slabs and scarring from resultant pressure sores.

CASE 2.—A sergeant, aged 31. On Nov. 29, 1942, in Tunisia, he sustained a compound depressed fracture of the right parietal region following the explosion of a mine. Immediate complete left hemiplegia resulted. After an operation on his head, recovery began, and for the first few weeks the power in the left leg improved rapidly but there was very little recovery in the arm. He said that when he went to the base before embarkation on Dec. 13, 1942, a fortnight after the wound, he could dorsiflex his left ankle well but while there he noticed it was weak again and that since that date it had remained so. On going further into the history it appeared that, while at the base, the patient developed a crop of boils on the right buttock which had necessitated him lying on his paralysed side for three weeks. He arrived in England on Feb. 7, 1943.

On examination he was found to have an almost complete paralysis of the left arm. The left leg lay with the foot plantar flexed and inverted. All movements of the leg were present but dorsiflexion of the foot was relatively weaker than the other movements and there was no actual power of eversion although the peronei could be felt contracting. In addition there was a small but definite area of hypoæsthesia to pinprick and to cotton-wool over the dorsum of the foot in line with the first three toes, but sparing the first interdigital cleft. Vibration sense in the leg was slightly impaired, position sense grossly so, but the distribution of the cutaneous sensory loss strongly suggested a musculocutaneous nerve lesion; the combination of extremely weak peronei with the story of sudden onset of weakness of dorsiflexion of the ankle made a clinical diagnosis of a partial lateral popliteal nerve injury certain.

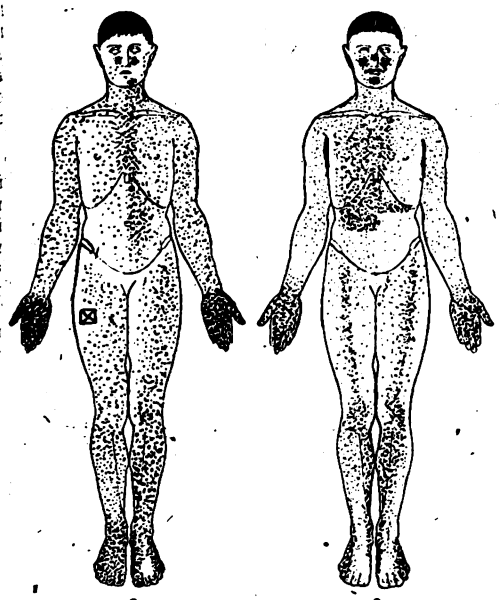

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Fig. 2—Case 2. Increased sweating on left side of body, and an area of anhydrosis over the distribution of the terminal branches of the musculocutaneous nerve of the left leg.

Fig. 3—Case 3. Band of increased sweating at Th.9-10 level, and absence of sweating over the distribution of both lateral popliteal nerves.

Electromyography on Feb. 16 showed no actual fibrillation but motor unit irritability was present together with very diminished motor unit action potentials in the peroneal muscles suggesting a transient block to the nerve; a sweating test on Feb. 15 demonstrated the central disturbance over the left side of the body together with a peripheral lesion of the leg corresponding to the musculocutaneous nerve (fig. 2).

Both neurological examination and electromyography suggested that the lesion was incomplete and this was borne out by the steady progress the patient made over the ensuing two months. On March 20 power in both ankles was equal. The little sensory loss still remained.

Here the cause of the lesion was undoubtedly pressure due to posture in bed and the peripheral nerve lesion could be readily demonstrated on clinical examination.

CASE 3.—A boy of 14. On May 3, 1942, he was accidentally shot by a stray bullet when visiting an aerodrome. The bullet entered at the outer aspect of the left shoulder and came out in the right lumbar region. He had an immediate complete paraplegia from the waist down. X-ray examination of the spine showed a fracture through the arch of Th.10. Some six weeks after the accident, a mass reflex could be obtained but it was noticed that there was no contraction of the extensor hallucis longus or tibialis anticus on either side, nor could the reflex be obtained by stimulating the dorsum of the foot although it could be elicited by stroking the outer border. The paraplegia remained complete.

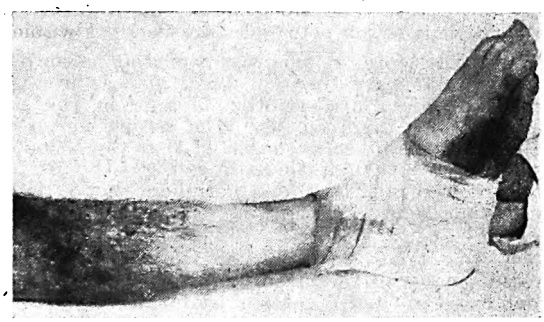

Fig. 4—Case 4. Sweating test: reaction over the outer side of the foot and front of the leg, and absence of sweating over the dorsum of the foot and outer aspect of the leg.

Electromyography on Feb. 3, 1943, showed fibrillation in the peroneal muscles on both sides corresponding to a lower motor neurone denervation. A sweating test on Feb. 9 showed a band of increased sweating at the Th.9–10 level, delayed onset of sweating in the legs and absence of sweating over the distribution of both lateral popliteal nerves (fig. 3).

The cause of the lesion here was presumably posture, no splints having been applied at any time. The only clinical evidence of its existence was the observation on the mass reflex, but electromyography and the sweating test proved its presence.

CASE 4.—A lance-corporal aged 28. This soldier was accidentally shot by one of his own men while in Libya on Dec. 21, 1942. There was immediate paralysis from the waist down and an X-ray of the spine disclosed a bullet lying to the left of Th.9–10 interspace with fracture of the tip of the transverse process of Th.10. Laminectomy was performed and the dura found intact. The bullet was not removed. There was no recovery. On Jan. 14, 1943, wire back splints were applied to the legs, extending up to the knees. A fortnight later a pressure sore developed over the head of the right fibula but it was not clear whether this was due to splintage or to posture. The sore subsequently healed but its position suggested that there might be an associated peripheral nerve lesion.

On April 29 the electromyogram showed fibrillation in all the muscles supplied by the lateral popliteal nerve on both sides and a sweating test on May 4 confirmed the peripheral lesion (fig. 4).

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Here was a complete flaccid paraplegia and the superimposed pressure palsy could only be demonstrated by the sweating test and electromyography.

CASE 5.—A sergeant aged 38 was wounded in a tank on Sept. 1, 1942, in Libya, and received a compound fracture of the left parietal region with resultant right flaccid hemiplegia. For the first three months the paralysis remained complete but then there was a fairly rapid improvement. On admission here, he had good movement in the arm and fair power in the thigh muscles so that he could hobble a few steps with the aid of a stick. There was, however, a persistent gross foot-drop. He had some 20° of plantar-flexion but only 5° of dorsiflexion of the ankle and no power at all in the peronei

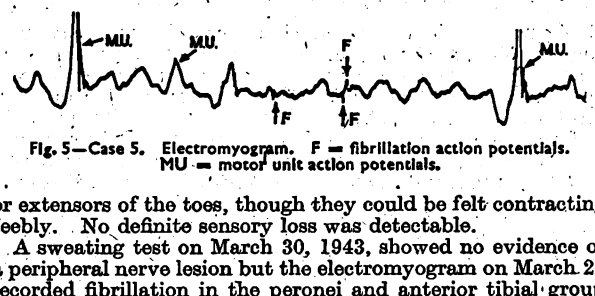

Fig. 5—Case 5. Electromyogram. F = fibrillation action potentials. MU = motor unit action potentials.

or extensors of the toes, though they could be felt contracting feebly. No definite sensory loss was detectable.

A sweating test on March 30, 1943, showed no evidence of a peripheral nerve lesion but the electromyogram on March 29 recorded fibrillation in the peronei and anterior tibial group of muscles together with strong motor unit irritability and some motor unit action potentials (fig. 5).

There was, therefore, in this case a partial lesion of the lateral popliteal nerve due to posture. It was interesting to note the dissociated motor damage in the nerve without sensory involvement. The strong motor unit irritability in the muscles suggested that the lesion here was slight, but although the main cause of the disability was clearly central, the added peripheral nerve damage will certainly delay recovery.

DISCUSSION

Pressure palsy of the lateral popliteal nerve has been demonstrated in these 5 cases of limbs already paralysed by a more centrally placed lesion; 3 were due simply to faulty posture of the paralysed limb in bed, 1 followed the application of plaster back splints, and 1 followed prolonged pressure on the nerve enforced by lying on the paralysed side because of a coincident infection in the other leg. It is not without significance that 4 out of the 5 cases came from overseas and underwent considerable transport with frequent changes of medical and nursing attendance. The fact that they have been seen in patients admitted to this hospital over a period of three months would imply that this complication is commoner than usually supposed. Within this period I have also seen a complete lateral popliteal palsy consequent on bandaging the knee after operation for a fractured patella and a partial palsy following a plaster cast applied for a fractured fibula.

The object of presenting these cases is to prove the existence of these pressure palsies in limbs already paralysed by a more central lesion, and to suggest that this incidence can be reduced by the adoption of simple prophylactic measures. Whatever kind of splintage is used on a leg, it must be carefully applied and immediate adjustment made should it slip. If a leg is put in plaster, the limb should be tested at regular intervals during the first few days after application, by the doctor or a trained nurse, to ensure that the patient can still dorsiflex his toes easily and that there is no blunting of sensation to pinprick over the dorsum of the foot as far as it is exposed. In the paralysed limb, avoidance of prolonged pressure on the lateral popliteal nerve becomes another important point in the careful nursing which all these cases demand; the limb must not be allowed to rest near the edge of the bed and it should be supported by a soft pillow under the knee. Careful attention must be given to the head of the fibula as a likely pressure point. In the Services, where these patients often have to be transported long distances in splints of various kinds and on hard narrow beds or stretchers, it is particularly important that the doctors and nurses in charge of them should be fully alive to the danger. Nursing, unfortunately, must often be rough and ready under these conditions and then it is the wisest policy, where applicable, to bandage on lightly a large pad of cotton-wool over the outer side of the knee.

SUMMARY

Attention has been drawn to the relative commonness in paralysed limbs of lateral popliteal palsies, due to pressure.

Five cases are recorded.

Clinically it is often impossible to differentiate these palsies, but electromyography and the sweating test clearly demonstrate them. It is stressed that all who have the nursing care of such patients, particularly in their transport, should be fully aware of the condition and prevent it by adopting simple prophylactic measures.

In many of these cases, where progress is often to be measured by so little, we must take especial care that in their treatment we do not unwittingly add to their disability.

I wish to thank Dr. L. Guttmann and Captain G. Weddell, RAMC, who were responsible for the sweating tests and electromyograms respectively; Brigadier Hugh Cairns for his advice and encouragement in the preparation of this paper; and Lieut.-Col. G. O. Chambers, RAMC, my commanding officer, for permission to publish these cases.

AN OUTBREAK OF GASTRO-ENTERITIS IN THE NEWBORN*

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OF late years both in this country and in America, there have been a number of obscure outbreaks of gastro-enteritis among newborn infants in maternity hospitals. The case-mortality rates have sometimes been as high as 80–90 %, and the results of treatment very disappointing. The need for further knowledge demands publicity for the findings in any such outbreak, and I accordingly report recent events in the maternity department of the Central Middlesex County Hospital.

The maternity block, quite separate from the general hospital, consists of two floors working independently, each floor having its own labour ward and accommodation for nearly 30 mothers and children. On each floor mothers are put either in single rooms or in small wards which seldom contain more than 4 patients; but the children on each floor are kept in one large nursery, to which is attached a large bathroom and changing-room. On the upper floor there is also a smaller nursery for premature infants and others that are weakly. All children are as far as possible breast-fed, but where complementary feeds are necessary they were prepared by a staff nurse in the general kitchen on each floor; between preparation and use they were kept covered in a cold larder. The nurses who fed the babies also had to do the changing, which took place on a special table in the bathing-room continuous with the main nursery, and these nurses also had to attend some of the mothers.

On Nov. 1, 1942, 2 out of 6 children in the prematures' nursery appeared to have gastro-enteritis and were immediately transferred to the general children's ward of the hospital. There were at that time in the upstairs nursery 24 children, and it happened that an exceptionally large proportion were receiving bottle feeds, only 12 of the total of 30 being *fully* fed at the breast. The remainder were having either complementary feeds in addition to breast feeds or were having bottle feeds of breast milk.

On Nov. 3 2 more children in the prematures' nursery developed gastro-enteritis and were transferred to the hospital children's ward. On the same day and the next day the condition of several children in the main nursery seemed unsatisfactory; so no further new cases were admitted to either nursery.

On Nov. 6 one of the children in the main nursery, who had had rather loose stools, suddenly died. A careful and critical survey was undertaken of all the children on the upper floor and the following steps were taken:

1. The upper floor was closed to all further admissions. It was not to be reopened until thoroughly cleaned.

* Based on a paper read to the Middlesex County Medical Society.

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2. The children were divided into two lots. (*a*) The 12 children who appeared to be well were transferred to a 4-bedded mothers' ward which was converted into an observation nursery. (*b*) The remaining 7, who appeared to have gastro-enteritis were kept isolated in the main nursery.

3. The nursing arrangements in the two nurseries were amplified and kept strictly separate.

Between Nov. 1 and Nov. 6, when the outbreak became obvious, 7 children had been discharged, 6 of these being fully breast-fed. The 7 who appeared ill on Nov. 6 all steadily became worse and died. Of the 12 removed to the observation nursery, 6, who were entirely breast-fed, did not develop any symptoms and were eventually discharged. The other 6 all developed gastro-enteritis within three days, and 3 of them died. The 4 infants transferred from the prematures' nursery to the children's ward also died. We therefore find that of a possible 31 children 18 became ill and 15 died, giving a case-mortality rate of 83%.

COURSE OF ILLNESS

The clinical course generally fitted the description of the serious cases given by Ormiston (1941). The average age at onset—excluding the children in the prematures' nursery—was 13 days. Some had been kept in the maternity nursery because they were not making satisfactory progress and were unable to feed from their own mothers.

As a rule the onset was sudden; but it was insidious in the 3 cases which recovered. The first symptom was usually unexplained vomiting, but in 6 cases it was a sudden loss in weight (up to 8 oz.) in children otherwise apparently well. In only 2 cases did the illness start with diarrhœa, but in all of them this soon became the worst symptom. The stools averaged 6 to 7 per day, their colour being usually yellow or orange. (This orange colour has been noted in other outbreaks.) The loss of weight averaged about ½ lb. in the first two days. The length of the illness varied from 2 to 21 days, and averaged just over 7 days. Progress, if any, was slow, and death was often rather sudden. Many of the children showed much abdominal distension, and in 3 cases the vomit became blood-stained before death. The temperature was usually either normal or raised to about 100° F.; in only one case did it reach 104° F., and this child recovered. Jaundice developed in 2, and sclerema in 4.

TREATMENT

For the first 12–24 hours nothing was given by mouth except half-strength physiological saline with 5% glucose. Dehydration was treated with subcutaneous salines, or in some cases with intravenous infusion of fluids by the drip method. Usually the infusion started with 500–1000 c.cm. of 5% dextrose in physiological saline, followed by 5% dextrose in plain water, or saline (one-fifth strength) with 4% dextrose, until dehydration was overcome.

Feeds, when recommenced, consisted if possible of expressed breast-milk, at first in dilution, or 'Trufood' usually following a short course of 'Secway.' Where vomiting persisted after the first 24 hours, gastric lavage was performed twice daily till it ceased. Rectal lavage was not employed. Sulphapyridine was tried in a few cases but without any obvious effect. Where sclerema developed local heat was applied by means of an electric blanket; the limbs were massaged frequently, and an extract of adrenal cortex ('Eucortone' 0·5–1·0 c.cm.) was given intramuscularly twice a day. Most of the children were given ascorbic acid 25 mg. daily.

PATHOLOGY

Of the 15 children who died 13 had fairly full autopsies.

The *intestines* showed very little change; in a few cases they were dilated, but no congestion or ulceration was found. The mesenteric glands were not unduly enlarged.

The *liver* showed some abnormality in every case. In 10 it was congested; in 6 there were fatty changes; and in 3 it was jaundiced. The fatty cases showed peripheral degeneration of the liver cells with replacement by fat. In some there was early proliferation of bile canaliculi as seen in adult cirrhosis. These changes were most conspicuous in the jaundiced livers. Such a picture of fatty liver may be found in children in any wasting or infective conditions.

The *thymus* in every case was smaller than normal. Some weighed as little as 1·5 grammes and the average was only 2–3 g. compared with a normal average of about 13 g. The thymus usually grows until puberty (when it may reach 28 g.) after which, by physiological involution the thymic tissue is gradually replaced by fatty tissue. However, in many diseases of childhood, mostly infective but not necessarily so, a so-called accidental involution takes place. Here the lymphocytes seem to disappear, while the reticulum cells swell and contain much fat and hæmosiderin. In most of our cases such involution was found.

The *suprarenals* were in all cases below normal size (average weight 1·5–2·5 g. instead of normal 3 g.). The histological changes were such as ordinarily occur when the child grows older.

The *spleen* in all but 2 cases was larger than normal and congested. It was not a septic spleen and was not soft; on section it showed congestion and much siderosis of the reticulo-endothelial elements—a change characteristic of all wasting diseases. The *lungs* in 1 case showed an early broncho-pneumonia and in 2 others a mild tracheitis; in 4 others there was slight emphysema. The *ears* were examined in 8 of the 13 cases and in 3 of these a drop or two of slightly mucopurulent fluid found inside one middle ear; in *no* case was there any otitis media in the ordinary sense of the word. The *heart* showed a congenital abnormality in 2 cases.

These findings did not indicate an acute intestinal infection—or even a septicæmia—but probably a toxic condition which caused wasting of the thymus and suprarenals and degeneration in the liver.

BACTERIOLOGY

Dr. E. F. Gale, of Cambridge, accepted an invitation to include this outbreak in an investigation he was undertaking. The combined results of his work and that of our own laboratory were not very conclusive.

In similar epidemics Dr. Gale had found an abnormally large number of hæmolytic fæcal streptococci in the fæces of affected infants. In our cases the stools showed the streptococcal distribution found in normal stools, and none of them yielded pathogens of the dysentery or food-poisoning group; but in 9 of the 18 cases, either from the stools or post-mortem specimens, or from both, *Pseudomonas pyocyanea* was isolated. This organism is often regarded as a harmless secondary invader, but it has pathogenic properties (Epstein and Grossman 1933). It has been known to invade the gastro-intestinal tract and cases of infantile diarrhœa have been attributed to it. On the other hand Fraenkel (1917) states that its rôle in many intestinal disorders with dysenteric manifestations is insufficiently established. It is known to be a common secondary invader during recovery from diarrhœa and it is often present in normal adult fæces. It could not be isolated from the stools of 20 normal newborn infants from our maternity block. The conclusion was therefore reached that, although the presence of the pseudomonas in a large number of our enteritis cases was unusual, the evidence was insufficient to show that this organism was the primary cause of the infection.

ILLNESSES BEFORE AND AFTER THE OUTBREAK

Examination of the records of infants who were in the maternity block during the four weeks before the outbreak did not reveal any case of diarrhœa and vomiting. Several children had had occasional vomits, or occasional green and loose stools; but apart from possible delay in its progress, no child had become ill and none had been transferred to the hospital children's ward. Symptoms of this kind, together with slight loss in weight, are commonly caused by feeding difficulties. It may be, however, that they were due to one baby after another contracting the disease in very mild form, until there was a flare-up of serious cases (compare Ormiston 1941).

Of the 13 children who had been contacts of the children that developed gastro-enteritis, all were discharged apparently well, and all but 2 are known to have remained well: one died of bronchopneumonia and one could not be traced. After the outbreak was over, a case of gastro-enteritis occurred on the ground floor of the maternity block. The infant had been segregated because he had an abscess on the chin and a mild furunculosis. He started having loose stools on Nov. 13, his condition gave rise to anxiety on Nov. 17, when he had rather a big drop in weight, and he died suddenly two days later. Examination of the stools showed no

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pathogenic organisms and the post-mortem findings were similar to those already described. There was no contact between this child and the upstairs nurseries.

From then onwards there were no further cases of diarrhœa or vomiting in the maternity block; but the hospital children's ward admitted 6 children with severe gastro-enteritis who were born in the maternity department, on the lower floor, between the time of the epidemic and three weeks later. Of these, 2 recovered and 4 died. In 2 of the fatal cases *P. pyocyanea* was repeatedly found in the stool, but the serum of neither child agglutinated an autogenous strain of the organism.

It has not been possible to trace any contact between these infants and those described above, but the cases are mentioned for the sake of completeness. If they are included in the series they make the total number of affected children 25 and the number of deaths 20 (80 %).

DISCUSSION

The results of treatment were very disappointing. Possible reasons are :—

1. We were dealing with newborn and premature children whose resistance was possibly at its minimum.

2. The infection, judging by the severity of the cases and the rapid spread, was virulent.

3. Ordinary methods of treating gastro-enteritis were unsuitable.

Sound treatment largely depends on knowing the cause of the illness; but the cause of this type of neonatal diarrhœa remains a mystery. Crowley, Downie, Fulton and Wilson (1941), examining the possibilities, concluded that it is either a virus invading the intestine, or else a systemic infection, intoxication or general metabolic disturbance leading to the proliferation of any pathogenic or potentially pathogenic organism that happens to be in the bowel. The fact that in our cases the intestines showed few pathological changes suggests that the condition was not primarily due to infection of the alimentary tract by a pathogenic organism, while the changes in the liver, thymus and suprarenals all point to a severe constitutional disturbance, probably of toxic origin. One striking fact stands out—namely, that all the breast-fed children remained well whereas all the children receiving bottle feeds of whatever kind became ill. This suggests an infection spread via the feeding-bottle and its accessories.

As the cause is unknown, treatment of the established cases can only be symptomatic, perhaps including prevention of complications. A major problem is to overcome the initial dehydration; but this is not in itself sufficient. Although adequate hydration nearly always stops the vomiting, the diarrhœa usually persists, and the toxic process seems to continue as shown by the steady downhill progress and damage to the liver and other organs. It therefore seems that treatment should include an attempt to maintain a normal liver function; mere administration of glucose is not enough. The use of vitamin-B complex is justified by experimental evidence that sources of this vitamin (crude liver extracts and yeast) and other water-soluble vitamins provide some protection against a variety of hepatic toxins. Vitamin B is also needed for metabolism of the sugar which is given.

There are two ways, however, in which much can be done. The first is to control the outbreak when it has occurred. This can be achieved only by closing down the departments concerned until all its patients have been discharged and thorough cleansing of the nursery has taken place. Attempts to short-circuit this procedure merely prolong the period during which cases will recur.

The second and perhaps more important way is to prevent the outbreak from occurring. We should insist on breast-feeding whenever possible, and to make bottle-feeding safer we should revise the routine of maternity units, where necessary, as follows :

1. There should be a separate kitchen or room for the preparation of bottle feeds with adequate refrigerator storage space.

2. Preparation of the feeds should be the sole responsibility of one person, who should not, at the same time, have any other duties which may bring her into contact with any possibly infected patient.

3. There must be scrupulous care in the sterilisation of feeding-bottles. The feeds should be separately prepared under aseptic conditions and should not be stored in bulk.

4. Nurseries should not be overcrowded and should be under the care of a special sister, preferably trained in a children's hospital. The infants should if possible be under the constant supervision of the pædiatrician of the hospital, with the coöperation of the obstetricians, and there should always be a sufficient number of trained nurses who understand exactly what is meant by contamination and whose sole duty is the care of the children.

SUMMARY

In the nursery of a maternity department 18 newborn infants contracted gastro-enteritis and 15 of them died, giving a case-mortality of over 80 %. After the outbreak there were 7 more, apparently unconnected cases with 5 deaths.

The outbreak was confined to bottle-fed infants.

Pseudomonas pyocyanea was isolated from the stools or elsewhere in 11 of the 25 cases, but it may have been a secondary invader.

The post-mortem findings suggested an acute toxic condition rather than an intestinal infection. The liver, thymus, and suprarenals were notably affected.

Treatment of this form of gastro-enteritis is at present empirical. The chief aims should be to guard against dehydration and protect the liver.

To prevent such outbreaks, breast-feeding should be encouraged, and in infant nurseries special precautions should be taken to avoid infection through bottle feeds.

I have to thank several of my colleagues for their kind help, especially Dr. W. Pagel and Dr. J. H. Humphrey for the pathological and bacteriological investigations.

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SULPHAPYRIDINE ABSORPTION THROUGH THE HUMAN PLEURA

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THE absorption of sulphanilamide and its related drugs has been investigated by many workers. Herell and Brown (1940) found blood levels of sulphanilamide up to 3·0 mg. per 100 c.cm. after thrice daily injection of sulphanilamide suspension into infected pleural and peritoneal cavities. Hudson, Smith and Selbie (1941), Hudson and Smith (1942), Hawking and Hunt (1942), Mueller and Thompson (1942) and Jackson and Coller (1942) have all obtained results which are in close agreement. The main points are that up to 10 g. of sulphanilamide placed in the peritoneal cavity has led to blood levels of about 10 mg. per 100 c.cm. of the drug (occasionally above 15 mg. per 100 c.cm.), with elimination from the blood at the end of four days. Hawking and Hunt also found that sulphadiazine similarly applied led to maximum blood levels of 10 mg. per 100 c.cm. and that excretion was incomplete in 2 cases at autopsy at the end of eight and ten days.

An account is given here of the absorption of sulphapyridine through the pleura as observed in 22 cases on the Thoracic Surgical Unit at Harefield. The sulphapyridine was placed in the pleural cavity as a powder at the end of operation, being smeared over the pleura immediately before the operation wound was closed. Morning and evening estimations of the amount of the free drug in the blood were then made, by a slightly modified Marshall's method, until the amount present was less than 0·5 mg. per 100 c.cm., recorded in the accompanying tables as a trace (tr.). No sulphonamides were given by mouth during this time.

BLOOD LEVELS

In table I the sex, age, operation, dose of sulphapyridine, and the serial blood levels are recorded. The lobectomies were done for bronchiectasis and the pneumonectomies for neoplasm, and the amount of drug inserted was usually 7·5 g., a few cases having 5 g. and

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TABLE I—BLOOD LEVELS OF SULPHAPYRIDINE (MG. PER 100 C.CM.) AFTER INTRAPLEURAL INSERTION AT LOBECTOMY (LOB.) OR PNEUMONECTOMY (PNEU.)

Maximum levels are shown in bold figures

Case	Sex	Age (yr.)	Opn.	Dose (g.)	Days: morning specimen (M), evening specimen (E)												
					E	1M	E	2M	E	3M	E	4M	E	5M	E	6M	E	7M
1	M	8	Lob.	5·0	4·5	**5·5**	4·6	4·9	3·5	2·3	1·8	1·1	0·8	0·7	0·6	0·5	..	tr.
2	M	19	„	7·5	2·1	**3·1**	..	2·3	..	0·9	0·8	0·7	0·6	0·6	..	tr.	..	..
3	M	30	„	„	**2·5**	**2·5**	**2·5**	**2·5**	1·4	1·2	0·9	0·8	0·6	tr.	..	..	..	..
4	F	20	„	„	1·3	1·4	1·4	1·3	1·0	0·8	0·7	0·7	0·5	tr.	..	..	..	..
5	M	20	„	„	2·4	**3·6**	**3·6**	**3·0**	1·7	1·1	0·6	tr.	..	..	..	..	..	..
6	M	20	„	„	1·1	1·1	1·1	0·9	0·6	tr.	..	..	..	..	..	..	..	..
7	M	22	„	„	1·0	1·7	1·5	1·1	0·9	1·1	0·9	1·2	0·7	tr.	..	..	..	..
8*	M	20	„	„	1·6	**2·1**	1·6	1·2	0·9	0·9	0·8	tr.	..	..	..	..	..	..
9†	M	30	„	„	1·2	1·4	1·0	0·7	tr.	..	..	..	..	..	..	..	..	..
10†	F	28	„	„	1·0	1·0	..	0·8	0·7	0·7	0·6	tr.	..	..	..	..	..	..
11	F	48	Pneu.	5·0	1·9	**3·0**	2·7	2·6	2·0	2·1	..	2·0	1·8	2·1	1·5	..	1·2	1·2‡
12	M	59	„	„	**2·6**	**2·6**	**2·6**	**2·6**	2·4	1·8	1·3	1·2	0·7	0·7	0·8	..	0·8	tr.
13	M	6	„	„	1·4	1·5	1·2	1·1	..	1·1	1·1	tr.	..	..	..	..	..	..
14	M	58	„	7·5	1·9	**2·1**	1·5	1·1	..	0·7	0·6	0·6	..	tr.	..	..	..	..
15	F	33	„	„	1·6	**3·4**	**3·4**	**2·3**	2·0	1·8	1·4	1·0	0·8	0·7	tr.	..	..	..
16	M	57	„	„	2·3	**4·1**	**4·1**	**3·8**	**3·6**	2·9	2·6	2·1	1·9	1·2	0·7	0·7	0·6	tr.
17	M	35	„	„	0·9	1·6	1·4	..	..	1·3	0·7	1·0	0·8	0·6	0·6	0·6	tr.	..
18	M	56	„	„	**2·5**	2·1	2·1	1·8	1·8	1·4	1·1	0·8	0·8	..	0·7	tr.	..	..
19	F	28	„	„	2·1	2·2	**2·8**	1·5	1·1	..	1·4	0·6	0·5	0·6	0·8	0·7	tr.	..
20	F	44	„	„	2·3	**3·8**	**3·8**	**3·2**	**3·1**	**3·3**	..	2·0	1·4	1·5	1·0	1·0	0·9	0·6¶
21	F	48	„	„	1·8	2·0	1·9	2·2	1·9	1·0	1·1	0·8	0·8	0·7	0·5	tr.	..	..
22	M	56	„	10·0	3·0	4·3	**5·3**	**4·8**	3·7	..	2·7	2·3	1·7	1·7	..	tr.	..	..

* "Under water" drainage for first 2½ days. † "Under water" drainage continuously.
‡ 7th day: E 0·8. 8th day: M 0·7, E 1·0. 9th day: M 1·2, E 1·0. 10th day: M 0·9, E 0·8. 11th day: M 0·6, E trace (tr.)
¶ 7th day: E tr.

one 10 g. Cases 8, 9 and 10 had "under water" drainage of the chest after operation. It will be seen that the maximum level reached was, with two exceptions, attained within 24 hours of operation (the operations were all done in the morning). One of the exceptions (case 22) had the larger dose of 10 g. The other exception, case 21, had the standard dosage of 7·5 g. The highest maximum was 5·5 mg. per 100 c.cm. in case 1, a boy aged 8 years, who had a dose of 5 g. This was closely followed by case 22, just mentioned, a man of 56, whose blood contained a maximum of 5·3 mg. per 100 c.cm. after a dose of 10 g. The lowest maximum was 1·0 mg. per 100 c.cm. in case 10, after a dose of 7·5 g. with continuous drainage applied to the chest. This was only slightly lower than the level of 1·1 mg. per 100 c.cm. recorded in case 6, which had the same dose and no drainage.

The time taken to eliminate the drug ranged from three days in case 9 to twelve days in case 11, the former having 7·5 g. of drug and the latter 5 g., with no drainage of the chest. Case 11 was exceptional, in that the blood level remained up four days longer than in any other case. The average time before the drug was eliminated was six days, to the nearest half-day, including all cases. The great variation in absorption of sulphapyridine, noticeable here, has been remarked on recently by Wilson (1943) in the case of absorption via the gut. The rate of elimination was fairly constant in each case, although there were a few temporary decreases, and sometimes the blood level of the drug increased for a short while after its initial fall. Four of these temporary rises followed aspiration of the chest, but usually aspiration of the chest was not followed by any visible effect on the blood content of the drug; it certainly never led to any increase in the speed of elimination that could be noticed.

The rather high maximum blood level in case 16 led to the discovery, on questioning the house-surgeon, that, after the routine blood-transfusion at operation, the patient had become slightly jaundiced. Later his urinary output had become disturbingly low and renal failure from an incompatible transfusion was feared, but the condition soon cleared up. Routine urinary output charts were not done and no correlation can be made between high blood levels of sulphapyridine and urinary output in the other cases.

PLEURAL FLUID LEVELS

Table II shows the relation between the amount of sulphapyridine in the fluids aspirated from the chest post-operatively and the amount in the blood at the same time. It is evident that the pleural fluid drug levels and the blood levels are not closely related; in case 18 they have apparently gone in opposite directions! The extremely high figure of 400 mg. per 100 c.cm. in the first specimen in case 20 can only be accounted for by the presence of solid powdered drug in suspension, the maximum solubility of sulphapyridine in serum being 70 mg. per 100 c.cm. at 37° C. and 50 mg. per 100 c.cm. at 25° C. according to Clarke and others (1942). There seems to be some very variable factor concerned in the absorption through the pleura, and in cases 2, 3 and 16, in particular, there seems to be a definite hindrance to absorption. In case 18 it seems probable that there was a hindrance to the circulation of the pleural fluid, so that there were different concentrations in different portions of the fluid, one or both of the specimens not being representative. The alternative conclusion, that the pleural fluid had not dissolved its full amount until after the time of the first specimen, taken on the 4th day after insertion of the sulphapyridine, seems unlikely. In any case the amount of drug in the first specimen was very low for one taken on the 4th day, while the amount in the second specimen was the highest of any taken on the 6th day.

In this connexion the findings of Hawking and Hunt (1942) are of interest. They placed a "microcrystalline

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suspension" of sulphadiazine, which is twice as soluble as sulphapyridine (Clarke et al. 1942), into the peritoneal cavity of two cases at operation. At the autopsies eight and ten days later they found the drug "like small cakes . . . surrounded by adhesions and lymph." Also of interest is Glynn's finding (1941) that sulphapyridine, placed in experimental wounds in rabbits as a powder, could still be found in situ seven days later, with fibroblasts growing around the crystals of the drug. These

TABLE II—SULPHAPYRIDINE CONTENT OF ASPIRATED PLEURAL FLUID WITH CORRESPONDING BLOOD SULPHAPYRIDINE

Case	Day of aspiration	Sulphapyridine (mg./100 c.cm.)		Case	Day of aspiration	Sulphapyridine (mg./100 c.cm.)	
		Pleural fluid	Blood			Pleural fluid	Blood
2	7	24·5	tr.	15	5	16	0·8
					7	2·6	0
3	8	11	0	16	3	70	3·7
5	3	52	2·5	17	4	26	1·0
6	3	21	0·8	18	4	3·9	1·3
7	3	28	1·0		6	45·5	0·7
	5	28	1·0	11	8	8·0	0·8
12	7	6·4	0·7	20	3	400	3·1
					7	41	0·9

two findings probably explain the irregular absorption found in the present study. The sulphapyridine powder tends to cake very soon after insertion into the pleural cavity, and a coating of fibrin is rapidly laid down. In addition, adhesions form and in a few days there may be considerable interference with the solution of the drug, and with the circulation of the pleural fluid, leading to impaired and irregular absorption into the blood-stream.

SUMMARY

Up to 10 g. of sulphapyridine powder placed in the pleural cavity at operation has, in 22 cases, barely and infrequently led to therapeutic levels of the drug in the blood. The maximum level reached was 5·5 mg. per 100 c.cm. This compares with maxima of 10 mg. per 100 c.cm. often reached after the intraperitoneal administration of sulphanilamide.

The average time for complete excretion of sulphapyridine has here been found to be six days, while other workers have found that sulphanilamide is completely excreted in four days when placed intraperitoneally.

Absorption of sulphapyridine through the pleura is irregular from case to case, greatly differing amounts of drug being found in both the pleural fluid and the blood at the same times after operation. This is probably due to caking of the powdered drug and the formation of pleural adhesions which interfere with free absorption.

I am indebted to Mr. T. Holmes Sellors and Mr. Vernon C. Thompson, surgeons to the Thoracic Surgical Unit at Harefield, for permission to do the investigations on their patients and for their help and criticism; to the house-surgeons, sisters and nursing staff on the wards concerned for their coöperation; and to Prof. Alexander Fleming for his advice on the final form of this paper.

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CORPUSCULAR VOLUME.—In Foy and Kondi's article on Ehrlich's Megaloblasts (*Lancet*, Oct. 23, p. 505) the hæmoglobin values are expressed in grammes per 100 c.cm., and not (as incorrectly stated) in percentages. The authors did not see a proof.

HEALTH OF THE FACTORY WORKER IN WARTIME

S. A. HENRY, MD CAMB, MRCP, DPH, DTM
HM MEDICAL INSPECTOR OF FACTORIES

(*Concluded from p.* 724)

POISONING BY BENZENE DERIVATIVES

Aniline poisoning became a notifiable disease in February, 1925, and the term is intended to cover poisoning not only by aniline, but by any nitro or amido derivative of benzene and its homologues such as toluene, which enters the body through the skin or otherwise, and alters the hæmoglobin of the blood.

In 1901, Hay and Prosser White, a certifying factory surgeon, carried out experiments which proved that dinitrobenzene was mainly absorbed through the skin; but it was not until 1916 that Prof. Benjamin Moore repeated experiments with TNT and the due importance of the skin as a channel of absorption was realised especially in regard to preventive measures. Subsequently, this knowledge became of special importance in the case of tetra-ethyl lead with its organic radicle "ethyl" and its serious effects on the central nervous system. The precautions taken by completely covering the worker has made the periodic medical examination of all blenders of this product in this country, performed until recently by Dr. H. E. A. Boldero, uninteresting clinically but otherwise highly satisfactory. Fig. 11 shows the distribution of the 832 cases of aniline poisoning since notification came into force, the mortality-rate being less than 0·5%. While other nitro and amido or amino derivatives have each contributed to a minor extent, the main causal agents have been aniline itself and since the war trinitrotoluol.

The increase in the number of cases during this war is significant, in fact, 529 (or approximately 63·5%) of all the cases have arisen between 1939 and 1942. Of these just over 83% have been due to TNT, 20 in makers as compared with 420 among the much larger number of those who fill shells and bombs. The 5 cases in the year before the war were all in makers of this explosive.

Though the number at risk is not available there is little doubt that it is substantially greater than in the last war. The cases of aniline poisoning notified in peace-time are but samples of several others in which the ashen grey coloration of the lips and tips of ears is present without the worker being aware that anything is wrong; but in war-time the vast majority of workers in contact with TNT are in Royal Ordnance Factories under continuous medical supervision, and in such factories there is an arrangement whereby every case of TNT cyanosis, however slight, is notified. The figures therefore represent a maximum rather than a minimum, and the mild nature of the cases is reflected in the absence of

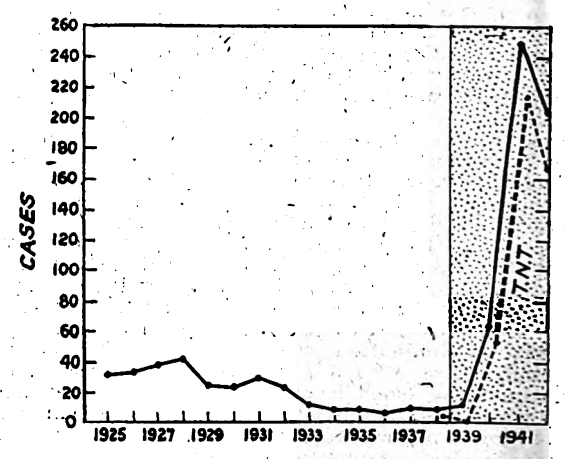

Fig. 11—Aniline poisoning, due to: nitrobenzene ($C_6H_5.NO_2$); dinitrobenzene ($C_6H_4.(NO_2)_2$); nitrochlorbenzene ($C_6H_4.NO_2Cl$); dinitrochlorbenzene ($C_6H_2.(NO_2)_2.Cl$); aminobenzene, or aniline ($C_6H_5.NH_2$); nitro-aminobenzene, or nitraniline ($C_6H_4.NH_2.NO_2$); chloraminobenzene, or chloraniline ($C_6H_4.NH_2.Cl$); trinitromethylbenzene, or TNT ($C_6H_2.CH_3.(NO_2)_3$); aminomethylbenzene, or aminotoluene, or toluidine ($C_6H_4.CH_3.NH_2$); chloraminomethylbenzene, or chlortoluidine ($C_6H_3.CH_3.NH_2Cl$).

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any fatality during the war. I suspect that the other notifiable diseases must resent the intrusion of this member into their select society, but perhaps he has a trump card up his sleeve to play later.

Toxic jaundice, which is officially described as "jaundice due to tetrachlorethane or nitro or amido derivatives of benzene or *other* poisonous substance," became a notifiable industrial disease on Jan. 1, 1916 (fig. 12). Since then 595 cases, of which over 25·5% were fatal, have been reported. Previously the nomenclature of any disease made notifiable had reference to the causal agent as, for instance, lead or phosphorus, but on this occasion a new departure was made by choosing a sign or symptom which might be caused by substances widely differing from each other in composition. It was known that, in addition to arseniuretted hydrogen, the earliest cases of toxic jaundice before the last war were attributed to dinitrobenzene. Tetrachlorethane used in the doping of aeroplane wings had caused at least 70 cases of jaundice with 12 fatalities between 1914 and 1916, but its use for this purpose ceased after 1916, and for many other purposes since that date, under persuasion, and so it is not surprising that no ill effects attributable to this product have arisen during this war.

Notification of toxic jaundice left the door open for other causal agents to be brought to light, and so paranitrochlorbenzene was held responsible for one case in 1920, dinitrobenzene for one in 1923, and trichlor-

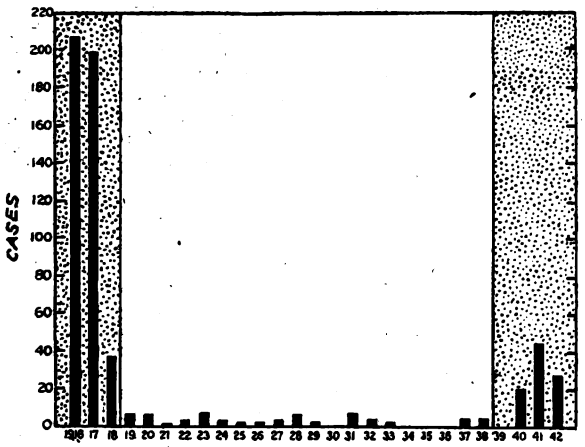

Fig. 12—Cases of toxic jaundice notified since 1916. Caused by: TNT, 501 with 130 deaths (25·9%); tetrachlorethane, 29 with 6 deaths (20·7%); arseniuretted hydrogen, 59 with 14 deaths (23·7%); chloronaphthalene, 3 all fatal; paranitrochlorbenzene, dinitrobenzene and trichlorethylene, 1 each; Total cases, 595 with 153 deaths (25·7%).

ethylene for one very doubtful case in 1932. This case was included with much misgiving, as it was felt that some tetrachlorethane might have been present, in error, in previous batches of the solvent liquid, but as careful inquiry failed to prove this suspicion, it was decided to place the case on record, leaving time to show whether one swallow makes a summer.

In 1938, 5 cases of jaundice of obscure origin, of which 3 were fatal, occurred at an optical works, a radio works and in condenser assembling. Contact in varying degree for 3¾ to 9 months with chlorinated naphthalene wax, or the fume from the heated wax, was elicited. Three other workers were found to have complained of nausea, dizziness and drowsiness, and at the same time, the now well-known "wax rash" was observed. Three cases of toxic jaundice (all fatal) attributable to chlorinated naphthalene wax have been notified during this war in women over 29 years of age who were employed for 6–9 months in impregnating coils or in scraping the wax from metal parts. In one of the cases there was an interesting latent period of 6 weeks from the time of leaving work, mainly for domestic reasons, to the manifestation of the jaundice. So on June 1, 1941, poisoning by chlorinated naphthalene was added to the schedule of the Workmen's Compensation Act.

But at the present time trinitrotoluene is the most prominent cause of toxic jaundice, which occurs to some extent during manufacture of the product, but mainly during manipulation when mixing, or filling shells or other containers. Fig. 13 shows the quarterly incidence

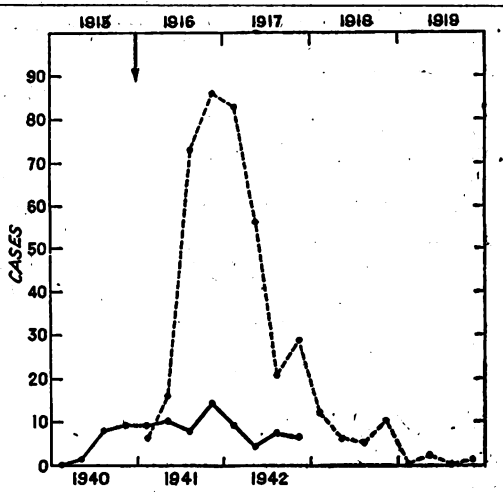

Fig. 13—Cases of jaundice due to TNT notified during this war and the last compared. Toxic jaundice became notifiable on Jan. 1, 1916.

during this war compared with that for comparable years of the last war, when there were 404 cases, 30% in males and 70% in females, manufacture being responsible for only just under 4%. In the period between the two wars there were only 12 cases, mostly in males manufacturing, filling, or breaking down old ammunition. There were no cases in 1939, but since 1940 there have been 85 cases, under 39% in males and over 61% in females. Manufacture was responsible for only 4 cases.

Unfortunately it is impossible for various reasons to compare the incidence of cases with the number of workers exposed to risk, but it is probably fair and safe to say that the number of workers employed and exposed to risk has not been less and has increased at a comparable rate since 1939 as in the three years after 1914; hence the incidence appears to be substantially less in this war. Exposure to risk before the onset of jaundice has varied from 2 or 3 weeks to 12 months for females and from 3 weeks to 15 months for males. The average age of the 52 females affected during this war has been just over 30 years and that of the 33 males in the same period 40½ years, the youngest female being 18 and the youngest male 19.

The lag period between the cessation of contact and the onset of jaundice has again been noted, 18 cases (22·4%) showing varying lag periods up to 9 weeks in males and 13¼ weeks in females. Of the 501 cases between 1916, when statutory notification of toxic jaundice came into force, to the end of 1942, 130, or just under 26%, have ended fatally; the death-rate for males being just over 21% and for females just under 26%. TNT is eliminated in the urine, and its presence can be shown by Webster's test, but this unfortunately gives no indication of liver damage and only indicates contact. A reliable test for early evidence of such damage is still awaited.

Sir Thomas Legge, who considered skin absorption to be the important cause, visualised that the replacement of hand filling by machine filling would reduce the cases to a minimum; but unfortunately machine filling is not always fool-proof and melted TNT gives off fume, and the view has been expressed in some quarters that inhalation of dust or fume plays a greater part in causation than was originally believed.

In 4 of the cases of TNT jaundice, a dyshæmopoietic anæmia was also present, and 5 cases of this type of anæmia without jaundice were observed in 1941 in male and female TNT workers. Hence, after careful consideration, on March 1, 1942, a new notifiable disease—toxic anæmia—was added by regulation to the existing list. For the purpose of this regulation, the term is intended to apply to dyshæmopoietic anæmia without reference to any special type, occurring in a person employed in a process which brings him into contact with X rays, radio-active substances and any chemical compound which may be capable of causing this effect, thus leaving the door open for discovery of new causal agents.

In modern industry, extended use is being made of radio-active substances, and X rays for process work.

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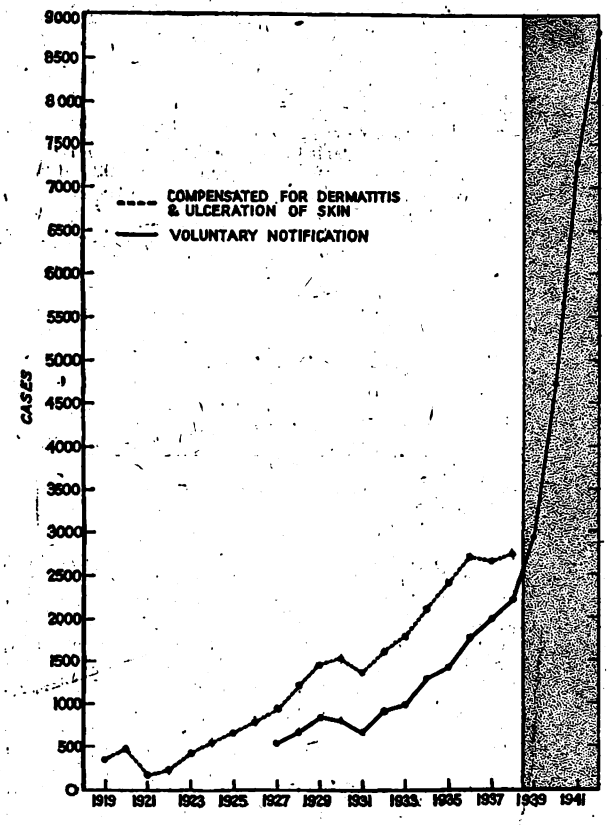

Fig. 14—Dermatitis produced by dust or liquids.

The effect on health is being carefully watched and preventive measures instituted on the advice of experts in radiology. In view of the great increase in the luminising of dials by a compound containing a radio-active substance—a process which had such dire results in New Jersey and to which Martland and his collaborators drew attention in 1925—the Factories (Luminising) (Health and Safety Provision) Order came into force on May 3, 1942. It regulates the conditions of work, provides initial and quarterly medical examination, prohibits employment under 16 years of age and for more than 48 hours a week and the introduction into the workroom of materials likely to become contaminated, including cosmetics other than those already applied. One temporary medical inspector with special pathological experience is devoting much of her time to proper enforcement of the order and to further inquiry, in coöperation with radiologists, into early effects on the blood and skin.

Since notification came into force 14 cases of toxic anæmia have been notified; 7, of which 3 were fatal, were attributable to contact with TNT for periods varying from 5 to 18 months. The youngest female was aged 22 and the youngest male 36. In the case of one male some 18 months elapsed after contact with TNT before the condition was observed. The other 7 cases were in women aged 28 and over employed for periods varying from 6 to 19 months in limited contact with benzene used in rubber solutions, and in one case, in aeroplane dope containing under 15%.

It may be argued that such cases might well have been cases of chronic benzene poisoning, but as the symptoms were mild and transient, in some cases only necessitating transfer to non-contact work, and as they did not present the classical later signs of purpura and hæmorrhage from the mucous membranes, they may possibly be considered as representing the earlier stage of benzene absorption requiring further study, thus exemplifying the value of making toxic anæmia a notifiable disease.

CHRONIC BENZENE POISONING

During the last war there were deaths from "aplastic" anæmia among men using a rubber solution containing crystallisable benzene during the building up of tyres, the benzene having replaced the usual naphtha which was required for other purposes. The picture was the classical one of dyshæmopoietic anæmia with purpura and hæmorrhages from the mucous membranes.

Eventually it was considered advisable to make chronic benzene poisoning a notifiable disease on Feb. 1, 1925, since when only 16 cases, 9 of which were fatal, have been reported, 7 having been reported since 1939. Probably there might have been more had not special attention been paid to substitution and ventilation in factories concerned. In 4 of the cases (apart from the blood picture of dyshæmopoietic anæmia) the post-mortem findings, or presence of purpura or bleeding from the mucous membranes, left no doubt as to the condition. The other 3 showed no signs of hæmorrhage, in fact, in one there was history of amenorrhœa, and possibly had toxic anæmia been a notifiable disease at the time it might have been considered advisable to place these 3 cases under that heading pending further knowledge.

DERMATITIS

I have previously referred to the inflammation of the skin caused by TNT; but that is only one of the innumerable agents responsible for "dermatitis produced by dust or liquids"—a condition, irritating to patient and doctor alike, which is not notifiable but subject to compensation. The precise legal term must be read in its entirety for the sake of compensation to the worker, for none of the words can be divorced from each other for purpose of certification by the certifying surgeon from whom the worker has to obtain a positive certificate before he can claim compensation. No alteration in wording can be made by the surgeon, even though in his purely scientific moments he feels sure that the cause is dust and not liquid, or vice versa. On the other hand, the term leaves a welcome loophole to those who cannot be quite so confident as to which is the cause if both types of causal agent are handled.

Voluntary notification of such dermatitis has been encouraged by the Factory Department for some years, and the cases coming to our notice seem, indeed, to constitute a fair sample of those arising annually in factories. This is borne out by a comparison of the number notified with the number receiving compensation, though the latter figure is only available to 1938; it must be appreciated, too, that the figures for compensation include many cases not arising on factory premises. Fig. 14 shows the progressive increase in number since 1927, and the significant rise during the war. But apart from the progressive knowledge and interest in the condition, we must bear in mind the introduction into industry of an increasing number of workers and causal agents, whether animal, vegetable or mineral.

When celery canning was first introduced celery dermatitis appeared, and new timbers have caused dermatitis in woodworking shops where previously it had been absent. On many occasions investigation of an excessive number of cases among workers in a particular factory has revealed the cause; and when appropriate measures have been devised, often with the help of the management, the so-called "epidemic" has ceased and not recurred.

Engineering accounts for nearly 23% of the cases, but if metal work, including welding, plating, and polishing is added, the percentage reaches 30·5. The most

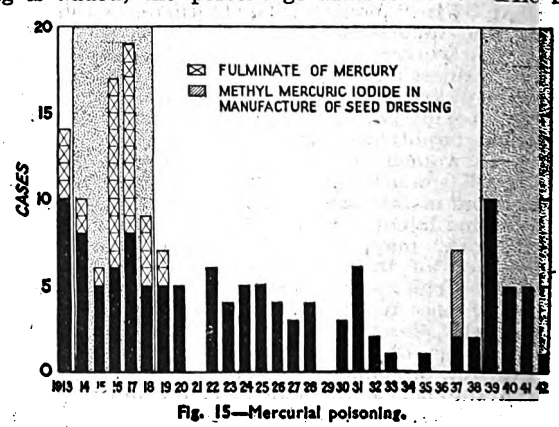

Fig. 15—Mercurial poisoning.

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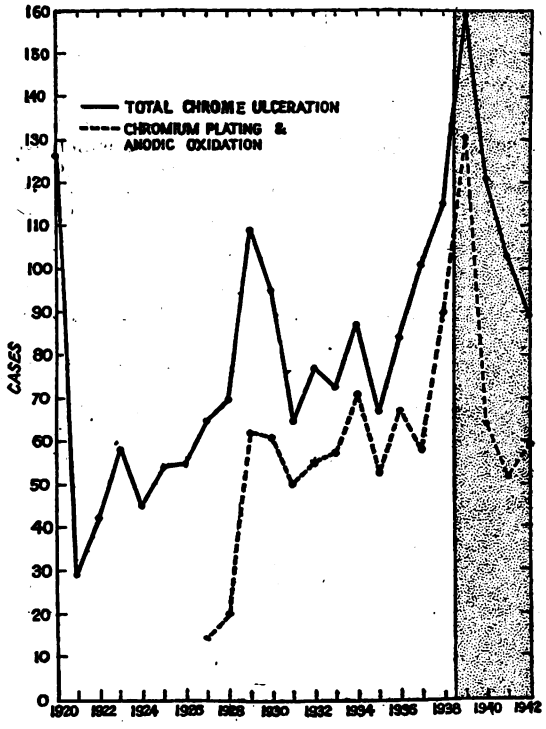

Fig. 16—Chrome ulceration.

significant increase during the war, however, is in connection with explosives such as TNT, tetryl and fulminate of mercury, which are responsible for 29·5% of the total number of cases since 1939. Contributing factors, such as economic conditions, extent of contact and length of exposure, must be taken into consideration when attempting to prevent this condition.

The influence of past economic conditions on the incidence of dermatitis is strikingly exemplified by comparing the incidence in two factories where in both there was a hazard of dermatitis due to tetryl. In one, where incidence of dermatitis was negligible, tetryl had been manufactured for many years. Ample labour was available from an adequately nourished population from which a careful selection of suitable workers had been made. In the other factory the incidence of tetryl dermatitis was high (with consequent large turnover of labour) in spite of medical supervision, nursing facilities, and provision of good washing and cloakroom facilities. The factory was in an isolated position, a very large number of workers had to be obtained at short notice from a population in which many were under-nourished and had been unemployed for years, and there was little opportunity for selection.

Evidence as to the influence of length of exposure on causation is forthcoming from one factory where artificial silk was manufactured by the cuprammonium process; 47 cases developed and length of exposure (most of the men being employed for 12 hours a day for 7 days a week) probably played the main part in causation. Since the number of hours has been reduced, only 1 case of dermatitis has been reported.

Recently an advisory panel on dermatitis in industry has been appointed, with Dr. Sibyl Horner as secretary, to advise the Ministry of Labour on matters affecting the question of dermatitis and, presumably, to share its burdens.

Among the 61 cases of mercurial poisoning (fig. 15) notified during the last war, 29 from the war-time manufacture of the explosive fulminate of mercury were included, but only an odd case or two really showed any of the well-recognised symptoms of mercurial absorption. The clinical picture caused by this compound was mainly dermatitis associated with conjunctivitis and inflammation of nasal and laryngeal mucous membranes.

During the present war the results of contact with fulminate of mercury have been mainly restricted to dermatitis, under which heading the cases have been classified and so are not represented in the 21 notified cases of mercurial poisoning, most of which were caused by the prewar processes of manufacture of thermometers and electric meters which have extended during the war. One, however, was due to phenyl mercuric acetate in the manufacture of a fungicide for seed dressing, but it is interesting that this product did not present the serious effects on the central nervous system which were caused in 5 cases in 1937 during the preparation of a seeding dressing containing methyl mercuric iodide, with its methyl radicle.

Poisoning by metallic mercury itself is one of the senior industrial diseases. About the year 1700 from Italy came Ramazzini's references to the typical salivation, tremors, stomatitis, and gastro-intestinal disturbance among those craftsmen engaged in water gilding in which an amalgam of mercury with gold or silver was used for decorating ornaments. During this process the mercury is volatilised by heat over a fire (hence also the term fire gilding) to leave the precious metals behind. So it is of interest that this ancient process was responsible for one case in 1939 in a female employed on gilding buttons for naval uniforms, the demand for which had greatly increased during the previous two or three months of that year.

Now in addition to fulminate of mercury, there are certain chemicals which, while sometimes causing a rash, may be more liable to give rise to an ulcer or ulcers localised and well defined, especially when the chemical enters an obvious abrasion. The main offenders are soda, brine, chromic acid and bichromates, giving rise to so-called "holes" on the skin, and, as with certain arsenical compounds, on the nasal septum, leading to perforation which, however, is practically never disabling. The fisher girls who in prewar days travelled from Scotland to the East coast to gut the fish during the herring-fishing season were liable to contract brine holes, a condition which is not notifiable but is subject to compensation under the heading of ulceration of the skin produced by dust or liquids. It may be some consolation to realise that any lack of herrings, under present circumstances, is compensated by absence of brine holes.

When such ulceration is caused by chromium compounds it is notifiable as "chrome ulceration," which is one of those conditions which, like the diffuse industrial rashes, can never be entirely prevented by regulations alone without the strictest supervision and the full coöperation of intelligent and educated workers in cleanliness of person and working methods.

Fig. 16 shows the distinct fall in the number of cases of chrome ulceration notified since 1939. Notification was introduced in 1920 because of the ill effect of the manufacture of bichromates. The introduction of the electrical methods of chromium plating and its opposite number anodic oxidation, led to an increase in notifications from 1927, while the introduction of a non-electrical process known as chromating of metals contributed from 1937. The main source of cases during the present war is, however, the chromium plating bath which is responsible for just under 43% of the cases, anodic oxidation contributing over 20%, manufacture of bi-chromates 10%, and chromating of metals over 7%.

The fact that only about 36% of notified cases seem to have claimed and received compensation is that the ulceration which so often develops on the nasal septum does not cause disability; and even with ulceration on the skin the patient is often able to continue work after the dressing has been covered by a suitable waterproof plaster.

It has often been said of chrome ulceration that it is never fatal, and of chrome itself that, although it is one of the greatest skin irritants in industry, it has never been responsible for a case of epitheliomatous ulceration.

* * *

This brings me to the end of the beginning. In these days, when there are rumours of the dawn of a new era of social security, social justice, and social medicine, the words of Christopher Columbus when he discovered San Salvador, re-echo from the past, and resound even in the calm atmosphere of this ancient and famous college: "The time has come. There are strange things happening."

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SUBCONJUNCTIVAL HÆMORRHAGE CAUSED BY AEROBATIC FLYING

A. G. CROSS
M D CAMB., F R C S
SQUADRON-LEADER RAF

JOHN BALL
M D MANC
FLIGHT LIEUTENANT RAF

SUBCONJUNCTIVAL hæmorrhage is common and its causes are many. Direct trauma to the eye, any factor raising venous pressure in the head, blood diseases, inflammations of the conjunctiva, acute systemic infections like cholera and typhus, lack of vitamin C, and menstruation[1] may give rise to this striking, and to the inexperienced frightening, condition. United States publications[2] have recorded it following aerobatic flying, but we have seen no similar report in this country, apart from a case described in a personal communication from Air Commodore Livingston.

Sgt. A. B., aged 19, was on Oct. 6, 1942, performing aerobatics in a fast single-seater aircraft. He tried to perform a series of vertical rolls, but stalled at the beginning of the third repeat of this manœuvre. The plane immediately "flicked on to its back"; its nose dropped, and it started to fall vertically, turning at the same time, so that the pilot was spun round as in a centrifuge. He was forced up against the harness and he found that great exertion was necessary to move his arms in the direction of his feet while there was a great feeling of congestion in the head. In his own words, "my eyes felt as if they were ready to pop, and the flesh around them about to burst; my vision was poor, the appearance being like looking through frosted glass." Fifteen minutes later he was seen by his station medical officer, when, in addition to diplopia, he complained of pain behind the left eye and discomfort of the eyes on movement. Examination revealed crescents of subconjunctival hæmorrhage above and below the cornea in both eyes and no other abnormality. He was ordered to rest in bed. Next day the hæmorrhage had spread beneath the whole bulbar conjunctiva. All pain had subsided in twelve hours and the diplopia by the sixth day.

On Oct. 13 he was examined by an ophthalmic specialist. The vision was 6/5 in each eye, there was no abnormality of muscle balance, the media and fundi were normal. The subconjunctival hæmorrhage persisted, but was absorbed by the fifteenth day. On Oct. 19 he was examined by a physician who found no abnormality of the cardiovascular system and he was passed as fit for all flying duties. A blood-count taken at this time was within normal limits.

The position of the pilot during the descent of his plane in a spiral turn caused the blood to be forced into his head, resulting in a rise of venous and arterial blood-pressure in that region. It has long been recognised that subconjunctival vessels are fragile. Treves[3] said that "these vessels also being feebly supported, are prone to give way under no great provocation." In this case the subconjunctival vessels ruptured, with extensive bilateral hæmorrhage. The diplopia and orbital pain may have been due to hæmorrhage in the orbits, but there was no evidence of bleeding elsewhere, though massive cerebral hæmorrhage has been produced in animals by raising the blood-pressure in the head by centrifuging. Other signs that have been described in similar cases, but were not observed in this one, are distension of the arterioles of the face, petechial hæmorrhages under the skin in the region of the head and increased lacrimation. In traumatic asphyxia, which is the result of pressure applied to the thorax, there is a rise of venous and capillary pressure in the head, but it is probably more slowly induced and more prolonged than in the above case and hæmorrhages of the vitreous in addition to those of the subcutaneous and subconjunctival tissues occur.

The sensation of "seeing red" which is recognised in aviation medicine as associated with a rise of vascular pressure in the head, probably as a result of congestion of the retinal vessels, was not noticed here, though he complained of misty vision. This may have been due to a vascular upset of the central nervous mechanism of vision or to transient corneal œdema due to venous congestion. The opposite condition, "blacking out," occurs when, in a "tight" turn, the blood is sucked away from the head and pooled in the splanchnic region: inadequate blood-supply to the central nervous mechanism causes temporary blindness.

Subconjunctival hæmorrhage, in itself, is not a serious condition and absorption is always rapid and complete.

We should like to express our thanks to Air Marshal Sir Harold Whittingham, KBE, Director-General of RAF Medical Services, and to Air Commodore P. C. Livingston, OBE, AFC, for permission to publish details of this case.

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Medical Societies

ROYAL SOCIETY OF MEDICINE

THE Surgical Section met on Dec. 1, with Sir JAMES WALTON, the president, in the chair. Opening a discussion on

Modern Methods of Skin-grafting

Mr. RAINSFORD MOWLEM said that though there has been no recent change in the basic methods of skin-grafting, the use of the sulphonamides and improvements in technique have enabled plastic surgeons to get better results than they did a few years ago. This is especially true in the grafting of septic wounds. Attention must be paid to the bed on which the graft is to lie, and on the exertion of even pressure to hold the graft in contact with the bed. It is still true that to obtain the best results an aseptic, non-œdematous and vascular bed is necessary, but so great is the need for early grafting in the prevention of fibrosis that the surgeon is often induced to employ grafts on wounds which would once have been thought unsuitable. In such wounds Mr. Mowlem believes that sulphonamides may claim to have doubled the chances of success. In his unit they use two types of graft: the split-skin graft and the whole-skin graft. They no longer use the pinch-graft. The cutting of the split-graft from difficult areas, such as the chest wall, has been made possible by the use of the drum (see *Lancet*, 1943, i, 532), a method which depends for its efficiency on the quality of the rubber solution used to stick the donor area to the drum; since rubber solutions vary, it is not a fool-proof apparatus. Where the texture of the skin matters, as on the face, whole-skin grafts are employed. These are non-contractile, and are therefore particularly suitable for the flexor surfaces of the fingers and the palm of the hand. In dissecting whole-skin grafts, all fat should be removed from the deep surface. The graft must accurately fit the area for which it is designed. They naturally destroy the donor area, and this may be a serious disadvantage in cases needing extensive grafts. Fixation of the graft is important; he sews the graft to the edges of the bed by a ring of silk stitches, leaving one end of each stitch long. Over the graft a mould, made of numerous small pledgets of cotton-wool soaked in liquid paraffin and flavine, is applied piece by piece, in such a way that it overlaps the graft by ½ in. all round. The long ends of the ring of stitches are tied across the mould. Thus the graft is pressed down and the edges of the bed are stretched upwards, so that close contact is ensured between the two surfaces. Both the patient and the bed which is to receive the graft must be prepared beforehand. Vitamin C and an ample diet raise the healing power of the patient; patients with large raw areas often show a severe degree of anæmia; but it is little use to try to cure this until the surface is grafted. Mr. Mowlem's practice is to transfuse at the time of the operation or immediately after it. Dehydration also deserves serious attention. The old method of preparing the graft bed with saline baths and ultraviolet radiation has, since 1940, been replaced by surface dressing with sulphanilamide powder, and by this means septic wounds can be made ready for grafting in less than 30 days. The powder is also applied beneath the graft at the time of operation. Success then depends on the infecting streptococcus not being resistant to sulphanilamide. *B. pyocyaneus* and *B. proteus* have both proved resistant, and may produce exudates which float the graft off its bed. He noted the importance of early grafting as a means of healing a septic wound, thus rendering possible earlier approach to parts underlying the wound. In non-septic wounds, his unit can show 94% of good takes, as com-

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pared with 83% in the earlier figures published by Rank. In septic wounds the improvement is 79% as against Rank's 41%. His criterion of a "good take" is 75% of the graft taken.

Mr. P. H. JAYES dealt with whole-skin grafting, and particularly with the use of skin-flaps in the repair of facial injuries. All surgeons called on to do traumatic surgery, he said, should be familiar with the technique of the free graft; skin-flaps have little place in immediate repair, but he sees great advantages in the initial treatment being carried out by the surgeon who will undertake the final plastic operations, and advocates the mobile plastic team. In reconstruction of the face, an immediate Thiersch graft is often used to cover a defect and promote rapid healing; when this is replaced by flap-grafting later, the absence of fibrosis is of great advantage. He showed photographs of the stages of repair in very severe facial injuries; flaps from the forehead have proved particularly successful.

Dr. A. H. T. ROBB-SMITH had done biopsies of the healing donor areas daily, and he demonstrated that the reaction in the dermis and the process of epithelialisation is well advanced by the third day, when the epithelium can be seen proceeding from the sweat ducts and glands, and from the hair follicles. Epithelialisation is quicker when it arises from hair follicles and slower in cases where the graft taken has been thick. In these deeper wounds the growth of elastic fibres is also slower and less perfect.

Dr. P. GABARRO described his method of "chess-board" grafting. The split-graft is spread on a sheet of sticky paper (such as that covering layers of tulle-gras) and cut into strips, which are transferred to another sticky sheet and cut into squares. These are applied to the wound at regular intervals. As many as 200 squares can be applied in an hour. The method is useful where the possible donor area is limited, and has the advantage of multiplying the growing edges of the graft many times.

Sir HAROLD GILLIES thought that the team work now possible in skin-grafting largely accounts for the improvement in results. Referring to histological work on the growth of grafts, he said that it has never been settled how the individual cells grow—how many cells, for example, can one cell produce? He thought Dr. Gabarro's method of piecemeal grafting excellent, and such methods of using split-grafts render pinch-grafts unnecessary.

The PRESIDENT noted that the rate of growth of the graft is important, because epithelial cells eventually revert to fibroblasts.

Mr. MOWLEM, replying, said he has no real objection to wet dressings, but has found his paraffin dressing very satisfactory. He does not believe it necessary to puncture the graft, because efficient pressure for 5–6 days precludes the need for drainage.

Perspective in Anæsthesia

At a meeting of the Section of Anæsthetics on Dec. 3 Dr. I. W. MAGILL read a paper entitled: *Is a proper perspective being lost by anæsthetists today?* Taking as his text the welfare of the patient, he showed how present-day anæsthesia often diverges from this end—for example, he maintained that the teaching of anæsthesia is poor in both substance and aim. Many specialists neglect physiological fundamentals in favour of dexterity with mechanical gadgets, and their teaching tends to produce practitioners knowing a little about many methods, but without the critical faculty and skill to use any of them well. It would be better, particularly in war, if a doctor could use one or two simple methods with safety, for while he is not expected to cope with major surgery it is tacitly assumed he is fully qualified to undertake major anæsthesia. Preoperative sedation is often a hindrance and sometimes a danger. The dose of sedative drug should not be excessive and it should be given at the right time, or respiratory depression may hamper the anæsthetist during induction and maintenance, and postoperative complications may become common. Basal narcosis is often given to pamper the patient rather than as something directed towards his welfare. He deprecated the use of 'Pentothal' before administering a spinal anæsthetic in the sitting position. On the subject of endotracheal anæsthesia, Dr. Magill had changed his original views and now felt that blind nasal intubation should be reserved for cases where oral intubation is contra-indicated; it should not be used for children or when an oral airway would suffice. Its use to enable a lazy anæsthetist to wander in and out of the theatre is to be condemned whole-heartedly, for it is not free from risk. It has earned a good deal of disrepute because of the "hard work of bad prodders who fail to use the laryngoscope and admit defeat." Dr. Magill deplored the use of one agent to the exclusion of all others, and holds that a mixture of agents—a balanced anæsthesia—is often more beneficial. He cited the dangers of the over-enthusiastic use of pentothal or cyclopropane, and pointed out how the judicious addition of ether can often prevent their abuse.

Dr. LANGTON HEWER stressed the importance of teaching in the attainment of a high standard of anæsthesia. The most useful method from the student's point of view is not always the best from the patient's.

Prof. R. R. MACINTOSH said that in travelling about the country he had found two common errors responsible for poor anæsthetic results—bad timing of premedication, and abuse of endotracheal tubes. Not only are tubes commonly used unnecessarily but they are often too narrow to provide adequate ventilation. He stressed the importance of the economic factor in attracting the right people to anæsthesia. Unless the rewards are adequate men of the best mental calibre will not take up this branch of medicine.

Dr. M. D. NOSWORTHY pointed out the dangers of teaching students what are fundamentally "stunt" methods, which may be satisfactory in the hands of the expert but disastrous if used by the novice.

Dr. R. BLAIR GOULD suggested that anæsthesia should be made a postgraduate study like advanced surgery, and Dr. Magill agreed.

Dr. GEOFFREY ORGANE and Dr. F. B. MALLINSON defended modern methods, and asked what should be done if a surgeon demanded a particular anæsthetic which the anæsthetist did not believe to be the best for that case.—Dr. MAGILL advised a change of surgeon.

Dr. RONALD JARMAN said he had anæsthetised over 700 patients for abdominoperineal resection of the rectum, by first putting them to sleep with pentothal and then giving a spinal in the sitting-up position. He had had five deaths.

New Inventions

PULSATOR VACUUM BOX

FOR TREATING PERIPHERAL VASCULAR DISEASE

THE mechanism here illustrated was devised for the application of intermittent negative pressure to one or both legs in the treatment of peripheral disease. A Hoover 'Dustette' vacuum cleaner produces a negative pressure in the box sufficient to raise a column of water 34 cm. A clockwork contact-breaker makes and breaks the circuit every five seconds. When the circuit is broken air rushes back into the box past the vanes of the dustette fan. The negative pressure is therefore built up for five seconds and the pressure then rapidly returns to atmospheric during the next five seconds. The following case-notes will illustrate the mode of action and results attained.

CASE 1.—A man of 60 had undergone considerable privations in Spain. Malnutrition, and calcification of the arteries of both legs had combined to produce severe attacks of cramp for several years. An accident, in January, 1943, in which the great toe of the left foot was injured, resulted in an extensive gangrenous condition of the left foot and leg; the right foot was also mildly affected. I first saw the patient in March when he arrived in England. He was extremely depressed and suffering great pain in both legs. On the left side, the dorsum of the foot was œdematous; the great, first and second toes and the distal half of the sole of the foot showed black gangrene of the skin; the leg and lower half of the thigh were œdematous, blotchily discoloured and absolutely cold, with the skin broken in many places. The right foot was œdematous, and the right leg up to the knee was in the same condition as the left. X rays showed all the arteries as calcified tubes. Amputation through both thighs had been advised both abroad and in England.

Both limbs were sealed in the box and the mechanism set in action, first for 20 min. daily and afterwards for increasing periods up to 3 hours daily. After 2 months the black gangrenous casing of the second and third toes burst and

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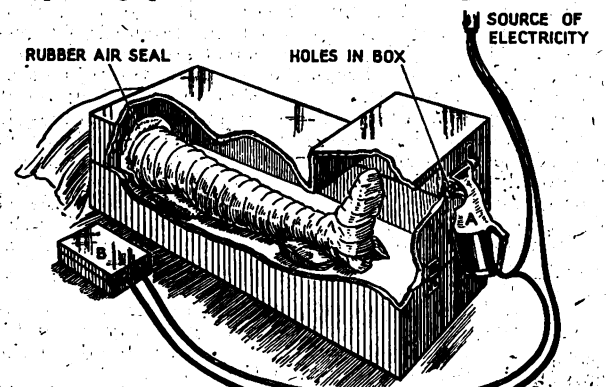
healthy skin was seen to be growing underneath. A line of demarcation formed at the root of the great toe which was then amputated. The wound healed rapidly. Both legs regained normal sensation and movement and both dorsalis pedis arteries could be felt pulsating. The man was able to stand after 3 months' treatment and he is now walking normally. The arteries of the limbs can no longer be detected on X-ray examination.

CASE 2.—A woman of 53, a diabetic who had given up her diet for several months. She had developed rapidly spreading wet gangrene of both feet, affecting chiefly the great toes, but spreading up to the middle third of both legs, which were



Pulsator vacuum box in action. A. Hoover dustette clamped on box; part of the nozzle is shown cut away to disclose holes through which dustette communicates with the inside of the box. B. Box containing clockwork contact-breaker making contact for 5 sec. and breaking for 5 sec. The joint between the base and lid of the box is airtight.

cold and œdematous. She was put back on her diet and brought into insulin balance. The pulsator vacuum box was used on both legs, starting with ½ hour daily and rapidly working up to 3 hours. In 6 weeks the gangrenous areas of skin, which had dried, shelled off, leaving healthy skin underneath. After 2 months the patient was walking normally.

CASE 3.—A woman of 50 had a varicose ulcer measuring 4 in. by 3 in. which had troubled her for 20 years, never healing over. The pulsator vacuum box was applied to the affected leg daily, starting with ½ hour and rapidly increasing to 2 hours. The ulcer quickly cleaned and was completely covered by firm healthy skin in three weeks.

These results were most gratifying, and the apparatus should prove useful in a variety of vascular disorders.

E. O. LAKEY, MRCS.

Reviews of Books

Conscience and Society

RANYARD WEST, DM, D PHIL OXFD. (Methuen. Pp. 260. 15*s*.)

BELIEVING that there are certain simple facts of human nature which can be inferred from philosophy, psychology and jurisprudence, but which have been as yet inadequately interpreted, Dr. West sets out to show how a total human society might be built. Much of his argument turns upon a criticism of Freud's views about aggression: he is convinced that Freud had himself an obsessional character which biased his judgment and particularly coloured his theories about hate. Dr. West holds that men need the external control for their aggressiveness which law provides, and that moral obligations cannot be a substitute for this. He pleads, therefore, for a world court utilising loyalty to a Total Society, and built upon agreement between us and our enemies. He refuses, because of his clinical observations as a psychotherapist, to accept the view that there are hidden springs of cruelty and hate in human beings, though he recognises that a "people's revolution against nationalism" or any other method of securing world-wide law and order would have to mobilise forces strong enough to maintain itself against attack. The thesis is elaborately developed, with much erudition and skill. Dr. West shows that psychological theories derived from study of the individual can be intelligently applied to the problem of a world society; whether the application would also be profitable and wise cannot now be decided, save by the event. The marriage of a scientifically established psychology of human nature to a sagacious political philosophy is not yet consummated, however devoutly this is to be wished: neither partner is nubile.

A Synopsis of Regional Anatomy

(5th ed.) T. B. JOHNSTON, MD. (Churchill. Pp. 424. 16*s*.)

THE fact that a new issue of this little book is demanded after an interval of only four years is evidence of its utility to the student who wishes to refresh his memory of the details of topographical anatomy. The new matter included in this edition consists, we are told, almost exclusively, of additional references to the functional aspects of the subject. Some of this functional anatomy is, however, a little vulnerable—for example, the statement: "It must be observed that the palmar aponeurosis gives no slip to the thumb, in contradistinction to the arrangement in the foot. The wide range of the thumb, which is in part due to this fact, is characteristic of the human hand." In a book in which the whole structure of the human body is described in so small a compass, some dogmatism is imperative; but it is somewhat daring to insist that "the subpubic angle in the female pelvis always admits a set square, but in the male pelvis it is always less than 90°." It is not for these things, however, but rather for the abbreviated account of the commonly accepted facts of topographical anatomy that this little book maintains its popularity.

Pictorial Handbook of Fracture Treatment

EDWARD L. COMPERE, MD, FACS, associate professor of surgery, Northwestern University, Chicago; SAMUEL W. MARKS, MD, associate in surgery in the university. (Year Book Publishers; Lewis. Pp. 340. 27*s*.)

IN this book, small and easy to handle, the authors have described the methods of fracture treatment which they have found most useful. The text is brief but well written, and the illustrations good. Operative methods appear at first sight to receive undue prominence, but non-operative methods are adequately described. Face and skull fractures are dealt with rather sketchily in a few pages. For internal fixation they have found many uses for threaded stainless steel pins of small diameter, and use four of these for femoral neck fractures. Unpadded plaster casts do not seem to be used. This should be a useful handbook for student or practitioner.

Advances in Enzymology and Related Subjects of Biochemistry

(Vol. III.) F. F. NORD, Fordham University, New York; C. H. WERKMAN, Iowa State College. (Interscience Publishers. Pp. 408. $5.50.)

THE subject of enzymology has made considerable advances in recent years, and Nord and Werkman's treatise is perhaps the most up-to-date summary of the present position. The frontispiece is a charming picture of Willstätter, and there is an appropriate quotation, from Arthur Stoll, on his work. The articles cover a great deal of ground including among other things chromosomes and nucleoproteins, the effects of temperature on enzyme kinetics, X rays and the stoichiometry of the proteins, verdoperoxidase, recent progress in tumour enzymology, and the rôle of micro-organisms and enzymes in wine making. The reviews are well written, though naturally difficult to follow for those not familiar with the details of each subject. The complex bibliography indicates the astonishing growth in our knowledge within the last few years—a point well illustrated by the good chapter on carbohydrate metabolism by Guzman Barron.

Diseases of the Skin

(6th ed.) OLIVER S. ORMSBY, MD; HAMILTON MONTGOMERY, MD, MS. (Kimpton. Pp. 1360. 70*s*.)

AFTER six years a new edition of one of the standard textbooks on skin diseases is welcome. There has been no alteration in classification which has always seemed one of the soundest features of this work. Much new matter has been incorporated, but the cutting of out-of-date material has perhaps not been quite ruthless enough. For example, in the treatment of erysipelas a long account of serum therapy is given, while only three lines are devoted to sulphanilamide, with no details of dosage. The make-up of the book is as good as ever, and six really beautiful coloured plates have been added.

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THE LANCET

LONDON: SATURDAY, DECEMBER 18, 1943

INFANTILE D AND V

ENTERITIS kills more children under the age of 6 months than any other infection except pneumonia. It is the most dreaded of hospital cross-infections. No doubt the steady fall in annual deaths from 36,000 fifty years ago to 3000–4000 in recent years has helped to divert attention from the apparently insoluble problems which this disease presents, but some recent happenings have brought it again into high light. Among these are the reported outbreaks of neonatal diarrhœa, an increased prevalence of gastro-enteritis during the spring of this year, and a greater consciousness of the unsatisfactory infantile mortality-rates that still prevail among the poor. The outstanding epidemiological features of infantile diarrhœa and vomiting, which masquerades under many synonyms, are summed up in its preponderance among artificially fed infants of urban poor-class districts. "Summer diarrhœa" would now be regarded as a misnomer, but it must not be forgotten that the infection used regularly to recur in epidemic waves during the late summer, and that the greater number of cases still fall between June and October. Its control demands much concerted investigation and enlightened propaganda directed particularly towards ætiology, treatment and prevention.

This apparently non-specific enteritis exhibits many of the features of an infectious disease; yet much painstaking research has failed to reveal any generally accepted causal organism, although a variety of bacteria, among them Morgan's bacillus, proteus, pyocyaneus, the paracolon group and *Clostridium welchii*, have had their supporters. Only a minority of cases can be attributed to specific pathogens like the salmonellas and the dysentery group. A virus affecting the parasympathetic ganglia leading to abnormal intestinal peristalsis has been postulated,[1] while the possibility of toxic split-products being formed from milk proteins by intestinal bacteria that have acquired abnormal enzymic activity[2] cannot be ruled out. Indeed the frequent liver damage seen at autopsy suggests that some toxic substance is absorbed from the gut; yet inflammatory reaction in the bowel mucosa is usually minimal or absent. These hypotheses are built on the assumption that the disorder is primarily in the alimentary tract, to which its preponderance in artificially fed infants (in different recorded groups[3,4] less than 5% were breast-fed) and its pristine summer prevalence give support. But there are many adherents to the view, advocated by MCKIM MARRIOTT, that the gastro-intestinal symptoms are secondary to parenteral infection, in particular infection of the respiratory system—otitis media and mastoiditis, upper respiratory catarrh, bronchitis and bronchopneumonia. EVANS,[5] for example, noted that ward outbreaks of non-specific diarrhœa among infants coincided with an unusual prevalence of respiratory infections among older children, while unequivocal parenteral infection at onset has been noted in 30–50% of cases by different workers.[4] LEATHART[6] has lately maintained that mastoidectomy is justifiable in the infant with gastro-enteritis who is going steadily downhill, and certainly the operation is often followed by remarkable recoveries. The minor epidemic wave this spring may also be cited as evidence supporting a primary respiratory infection, although a plague of flies at the time may have contributed to the spread.

Treatment of infantile D and V has not advanced notably in the past decade or two. The different standards of assessment of severity make it difficult to compare the results of different methods of treatment, and the adoption of certain objective criteria is an essential prerequisite in any investigation.[7] Even so, the published figures indicate that the fatality-rate among dehydrated infants under 9 months is usually over 50%. A preliminary examination of the blood chemistry (chlorides, alkali reserve, plasma-proteins) and evidence of hæmoconcentration will help to decide the child's fluid needs. Fortunately the intravenous drip has now become a routine procedure, and the dehydration plus the diminution in chlorides and bicarbonate which is usually found in infants with D and V can best be rectified by Hartmann's half-strength Ringer-lactate solution with or without glucose, followed if need be by plasma or serum. The poor capacity of the infant kidney to concentrate waste or excrete chlorides must not be forgotten[8]; œdema of the tissues, in particular of the brain, is too common an autopsy finding in these cases. Even with the most assiduous attention, however, some infants show temporary improvement only to relapse in a way suggesting that some irreversible change in the tissues has deprived them of the faculty of utilising water and minerals. It must be the duty of all concerned to prevent the child reaching this stage, and the early correction of dehydration by intravenous fluids needs a much wider application. Regular weighing of the infant is a good guide to success. Feeds by mouth should follow the lines recommended by FIELD and others.[7] The rôle of sulphonamides in the treatment of gastro-enteritis is still ill-defined. Where there is parenteral infection a soluble and relatively non-toxic drug like sulphamezathine should be used. Succinyl-sulphathiazole deserves a trial in view of its inhibitory effect on the coliform group. Good results with it[9] and with sulphaguanidine have been reported in small groups of cases of neonatal diarrhœa.

Obviously if progress is to be made in the control of gastro-enteritis the paramount need is for prevention—prevention in institutions[11] and prevention in

1. See Crowley, N., Downie, A. W., Fulton, F. and Wilson, G. S. *Lancet*, 1941, ii, 590.
2. Gale, E. F. *Biochem. J.* 1940, 34, 392, 846.
3. Cooper, E. D. *Arch. Dis. Childh.* 1937, 12, 339; Smellie, J. M. *Lancet*, 1939, i, 969.
4. Campbell, R. M. and Cunningham, A. A. *Arch. Dis. Childh.* 1941, 16, 211.
5. Evans, P. *Ibid*, 1942, 17, 130.
6. Leathart, P. W. *Brit. med. J.* 1943, ii, 168.
7. Field, C. E., MacCarthy, D. and Wyllie, W. G. *Ibid*, 1943, i, 371.
8. Young, W. F. *Proc. R. Soc. Med.* 1943, 36, 219.
9. Twyman, A. H. and Horton, G. R. *J. Amer. med. Ass.* 1943, 123, 138.
10. Henderson, J. L. *Brit. med. J.* 1943, i, 410.
11. See Mitman, M. Control of Common Fevers, London, 1942, p. 259.

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poor-class homes. In hospital, open wards containing a large proportion of children under 2 years of age must be avoided, for they can be veritable death-traps if enteritis is introduced. Great Ormond Street, and certain Scandinavian and American hospitals have solved the problem of enteritis as a hospital infection by providing cubicle isolation for every infant under a year. Isolation accommodation is desirable for all infants admitted with gastro-enteritis, for the danger of relapse in open wards, besides the risk of cross-infection, is considerable. Only the more severely ill cases should be taken into hospital. Prevention would be largely achieved if all mothers could breast-feed their babies for 6–9 months. The fact that only 30–50% of mothers feed their infants for even 3 months is due to a variety of causes. As CRUICKSHANK[12] says, "A longer period of rest after confinement, more home help, proper feeding of the mother, the care of the nipples before confinement, more frequent and complete emptying of the breasts during feeding to stimulate lactation and prevent infection through milk-stasis, and, in particular, education of both doctors and the lay public about the advantages of breast-feeding, would all help to secure proper lactation and thus save a large proportion of the 3000 infants who die every year because they are not breast-fed." Bottle-feeding in the newborn requires a vigorous ritual and a standard of aseptic technique as high as that of the operating table or the labour ward.

The report by SAKULA on an outbreak of neonatal diarrhœa (p. 758) further emphasises the risk attendant on artificial feeding of young infants. Not one of 12 babies who were wholly breast-fed contracted the infection, whereas all of 18 artificially fed infants became infected and 15 of them died. Similar findings were reported by CRAIG.[13] In two outbreaks described by ORMISTON[14] only 7 of 51 affected breast-fed, compared with 20 of 30 artificially fed infants died in one maternity home, while in the other all the affected infants (case-fatality 38%) were artificially fed. There is a tendency to regard neonatal diarrhœa as a disease sui generis, but it has many clinical and pathological features in common with the D and V of older infants and its ætiology is equally obscure. Here is a problem of the first magnitude requiring concerted effort by teams of pediatrician, bacteriologist and biochemist working in close cöoperation.

TYPHUS VACCINES

A CRUCIAL EXPERIMENT

PRESENT knowledge of the value of typhus vaccines made from killed rickettsiæ may be summarised briefly. The Weigl vaccine made from the intestines of infected lice has been proved to have some practical value in the field, but it is very difficult and costly to make: lice have to be infected and then reared on typhus-immune persons, and as many as 100 or 200 lice may be required to provide enough vaccine for one subject. Other sources of vaccine are yolk-sacs of infected developing eggs (Cox) and lung suspensions from infected mice, rabbits or dogs. All these yield abundant rickettsiæ and are promising in the laboratory. They are far easier to prepare than the Weigl vaccine; especially is this true of the egg vaccine which is being made on a large scale across the Atlantic. We do not yet know, however, how far they protect man from naturally contracted infection. Though they probably reduce the severity of the disease, they are not 100% perfect in preventing infection of typhus workers heavily exposed in the laboratory; but neither apparently does the Weigl vaccine meet this severe test.

Now appears a paper from Germany[1] which seems to answer all our queries. Groups of persons were inoculated with one or other of six vaccines: (i) louse-gut vaccine (Weigl); (ii) egg-yolk vaccine (Cox) made at the Robert Koch Institute, Berlin; (iii) and (iv) weaker preparations of egg-yolk vaccine made at Marburg and containing murine as well as epidemic rickettsiæ; (v) rabbit-lung vaccine made in Paris (Giroud); and (vi) dog-lung vaccine from Rumania (Combiescu). The incidence and severity of typhus in the six inoculated and in two control groups are recorded. Age and other factors were comparable in the various groups; the vaccination had been carried out, in the inoculated groups, 6 to 8 weeks previously. The results were clear: the weaker egg vaccines from Marburg and the Rumanian dog vaccine were less effective than the others, but essentially there was no difference between the results obtained with louse, egg and rabbit-lung vaccines. No deaths occurred in those receiving any of the vaccines except the Marburg ones, whereas the fatality-rates in the two control groups were 33% and 20%. The incidence of the disease was unaffected by inoculation, but its severity was much reduced as judged by height and duration of fever, extent and duration of rash, loss of weight, severity of circulatory and nervous symptoms, and incidence of complications. We draw the important conclusion that the egg vaccines, on which Britain and the United States are relying, are, if not ideal, at least as good as those of any other type.

Apart from its more obvious conclusions, this paper contains other significant information. First, its author, Dr. ERWIN DING, describes himself as a storm-troop leader. Secondly he quotes percentages throughout, but carefully refrains from stating how many persons there were in each group. Study of the percentage figures reveals that the groups must have been large, each comprising at least 20 to 50, and possibly many more; an incidence of complications of 0·5% (table 7) suggests a number of the order of 200 in at least one group; and we may deduce that several hundreds were involved altogether. Thirdly, he only includes, in this study of some hundreds, those people concerning whom he accurately knows the day of infection; which information would, one would imagine, be rarely obtainable in the ordinary course of events. Fourthly, the incubation period was far shorter than is accepted for typhus, being as little as 2 to 3 days for most of his controls, and not much longer for the inoculated. Thus, it seems that particularly heavy infections occurred in some hundreds of persons on known days during the investigations of a storm-troop leader. We leave our readers to make their own deductions.

12. Cruickshank, R. *Brit. med. J.* 1943, ii, 159.
13. Craig, W. S. *Lancet*, 1936, ii, 68.
14. Ormiston, G. *Ibid*, 1941, ii, 588.

1. *Z. Hyg.* 1943, 124, 670.

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WORK FOR THE DISABLED

IT was fitting that Mr. TOMLINSON should introduce the second reading of the Disabled Persons (Employment) Bill, for the bill is based directly on the report made under his chairmanship by the Inter-departmental Committee on the Rehabilitation and Resettlement of Disabled Persons. This report discussed rehabilitation under three distinct headings—medical rehabilitation, post-hospital rehabilitation, and resettlement. The first covers the treatment given before the patient becomes fit (in theory) for any form of vocational training or reconditioning, and this stage of rehabilitation is not mentioned in the bill. Post-hospital rehabilitation, bridging "the gap between the completion of hospital treatment and fitness for employment or occupation within the scope of the disablement," is dealt with in clauses 2–5 which suggest machinery for the establishment of vocational training courses and of industrial rehabilitation courses and for the care of the disabled attending these courses. It is specifically stated that such persons shall be "under adequate medical supervision," and it may be presumed that the medical supervision will be provided by the Ministry of Labour, since no mention is made in the relevant sections of any other Government department except the Treasury. The facilities mentioned under these clauses are in fact already available and form a substantial part of the Ministry of Labour's interim scheme for the training and resettlement of disabled persons, introduced in October, 1941. The practical value of the scheme, although operated on all too small a scale, has been abundantly proved, and if in war-time it could have been more widely applied and more widely advertised it is possible that the more controversial part of the bill would not have been thought necessary. This part concerns the third phase of rehabilitation, named in the Tomlinson report "resettlement."

The Tomlinson Committee formed the opinion that in spite of medical rehabilitation and post-hospital rehabilitation a substantial number of the disabled would remain unable to secure satisfactory employment. In order to protect them they made three recommendations, which are now incorporated in the bill, namely: (*a*) the introduction of a quota of disabled persons, and the imposition upon employers who do not satisfy the quota of a restriction on the engagement of workers; (*b*) the scheduling of certain occupations for the benefit of disabled persons; and (*c*) the creation of a Register of Persons Handicapped by Disablement. Any employer who has 25 or more employees will be required to employ a certain proportion of disabled persons, the actual number depending on a standard fixed for different types of work by an Order made by the Minister after consultation with organisations representing employers and workers. To satisfy the terms of the quota the employment must be given to persons who are on the register of handicapped persons. With the exception of pensioners of the last war, whose names are entered automatically, entry to the register can only be obtained after application by the person concerned; and that means that a disabled man—say with an artificial leg—would not count towards his employer's quota unless he had previously had his name entered on the register. The scheduling of certain occupations so that vacancies in them shall in future be filled only by registered persons is of course a less novel idea. In Japan the practice of massage was restricted by law to the blind: the blind masseur paraded the street ringing a bell to advertise his whereabouts and his calling.

The Tomlinson Committee's proposals for a register, quota and schedule of occupations have not passed without criticism. Last March representatives of various training colleges for the disabled wrote to the *Times* expressing their conviction that "Success in the rehabilitation of the disabled depends very largely upon the burning desire each of them possesses to be an object neither for sympathy nor for charity, but able to work independently for a living and to hold down his job by his own merit as a workman." The same conviction appears in a memorandum by the Central Council for the Care of Cripples, which points out that the report was made by a committee of civil servants who were specifically forbidden to take evidence and therefore had to "make proposals" from their own personal knowledge. It was surprising to find that the committee had no members with long personal experience of the training and employment of the disabled. Indeed they emphasised their own lack of expert knowledge by drawing attention to the need for more information as to the suitability of particular disablements to particular occupations and suggesting that "the Ministry of Labour and National Service should examine this question and consider what would be the best way of collecting the information and making it available to the Employment Exchanges."

Actually much of this information was already available, and if the information had been before the committee they might not have made the recommendations of quota, register, and schedule. Apart from the work of individuals in this country, a vast amount of research has been done in the United States of America; for example the United States Civil Service Commission lists some 20,000 jobs practised by persons with disabilities. The success of the work of rehabilitation by the State Departments on the lines covered by clauses 2–5 of the bill was such that last May the United States Office of Education, in a comprehensive analysis of the Employment Efficiency of Physically Impaired Workers, said:

"Replies were received from more than 100 employers, most of whom are large corporations engaged in the manufacture of war materials and equipment and are employers of a considerable number of persons with physical impairments. These replies indicate, conclusively, that physically impaired workers produce as much or possibly a little more than the able-bodied workers. More significant, however, is the practically unanimous report that the handicapped are dependable, regular in attendance, and careful in observance of safety regulations.

"Of the employers reporting on these points, 99% said the handicapped worker sticks to his job as well as or better than the able-bodied worker, and 95% reported that their attendance record is as good as or better than that of the able-bodied. Only 2% of the employers have found their handicapped workers to be more accident-prone than the able-bodied. More than half of the employers reported their handicapped workers to be *definitely better* than the able-bodied in respect to frequency rates for turn-over, absenteeism, and accidents."

Broadly speaking, the results of these investigations show that if a person has the stamina to remain at work during normal working hours, it is possible to place him, with or without special training, in

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remunerative employment where he can earn his living on equal terms with the able-bodied. The great difficulty is to persuade the employer to give the man a chance. In Mr. BEVIN'S bill the employer will be compulsorily persuaded. From the point of view of the injured person this is unfortunate and may even be disastrous, for both employer and disabled will become "cripple-minded"—the employer because he is forced to take labour which through ignorance he instinctively distrusts, and the employee because he knows he is a marked man, distrusted and resented by his employer. The disabled man deserves of the state something better than this, and this something can only be provided if he has a willing employer and if the conditions of service are such that he can give willing service.

The register, the quota and the schedule are just another method of providing pensions and they will always be regarded as such. What is needed is a big educational campaign to teach the disabled, the employers, fellow workers, doctors and public, that almost every disabled person can, if given a fair chance, be rehabilitated to earn his living in the open labour market in competition with the able-bodied. There will be an exceedingly small residue who are untrainable, and these should be permanently withdrawn from the open labour market and employed in sheltered occupations directly controlled by the state.

Annotations

PARLIAMENTARY MEDICAL COMMITTEE

AT its first meeting in the new session the Parliamentary Medical Committee elected the following officers:

Dr. A. B. Howitt, chairman.
Prof. A. V. Hill, SC D, FRS, and Major B. Neven-Spence, joint vice-chairmen.
Sir Henry Morris-Jones, treasurer.
Mr. H. Linstead, PH C, secretary.
Dr. Haden Guest will serve as representative on the Central Medical War Committee; he and Sir H. Morris-Jones on the Medical Planning Committee.

Dr. Howitt's elevation to the chair follows on his devoted service over many years in the office of secretary. It has always been the practice of the committee to extend a welcome to University representatives, and Professor Hill brings the prestige of an ex-holder of a chair of physiology and a joint secretary of the Royal Society. Mr. Linstead's presence will ensure happy relations with the pharmaceutical profession. The committee is now in a position to take an active part in the discussions on the Government's proposals for the setting up of a comprehensive medical service. We may well hope that it will extend its influence in the House of Commons to all matters with which the medical services are concerned.

PURE KIDNEY FACTORS

THE pharmacological work arising out of Goldblatt's discovery of the relation between renal ischæmia and hypertension has been extensive. The most important investigations have been those of Braun-Menendez in the Argentine and of Page in Indianapolis, with their respective collaborators. Using the South American terminology which seems simpler and more logical than Page's it is now established that renin acts on a globulin (hypertensinogen) in the blood to produce hypertensin, which is the actual substance responsible for the vasoconstrictor properties of renin. A substance hypertensinase has also been demonstrated which inactivates hypertensin. These various factors are now the objects of chemical investigation. Katz and Goldblatt[1] have obtained a sample of renin from hog kidneys by extraction in alkaline solution and subsequent treatment with trichloracetic acid, acetone, ethyl alcohol and ammonium sulphate precipitation. There is an activity of 4 dog units per mg. of nitrogen in the crude extract and 130 dog units per mg. in the final product, which is about 6 times more active than the most potent extract previously described, and chemical investigations show the product to be a protein. Preliminary investigation of its purity by Tiselius electrophoresis suggests that it is homogeneous. Its pharmacological properties are the same as those of crude samples of renin. It is an interesting fact that the pure compound has no effect on the blood-pressure in human beings. The South American workers originally suggested[2] that the production of hypertension from hypertensinogen is an enzymic reaction, and that hypertensin is a proteose or polypeptide. This conclusion has been confirmed by a group of Scandinavian workers,[3] and the enzymic nature of the reaction has been demonstrated and studied in some detail by Plentl and Page.[4] These latter workers, with Davis,[5] have made an electrophoretic analysis of pig serum, which contains five distinct proteins. Fractional precipitation with ammonium sulphate allows separation of γ- and α-globulins. The α-globulin has an electrophoretic pattern with two peaks, indicating the existence of two forms of α-globulin, and it is the α_2-globulin which is or contains hypertensinogen, since it alone acts as a substrate for the production of hypertensin. Page and Helmer[6] have already claimed the production of crystalline salts of hypertensin. Croxatto and Croxatto,[7] in Chile, have been able to purify considerably and to separate hypertensinogen and hypertensinase from ox-serum. It is evident that the isolation of the various factors in a state of chemical purity is proceeding rapidly.

OPIUM TRAFFIC IN THE FAR EAST

THE international control of drugs of addiction took its origin from the international opium conference held at the Hague in 1911–12. In the convention drafted by that conference it was (by article 6) the avowed object of the contracting powers to take measures for the gradual and effective suppression of opium-smoking by prohibiting the manufacture of and internal and external trade in "prepared opium." Those powers not yet ready to carry out this policy pledged themselves to do so as soon as possible. Twelve years later at the opium conferences at Geneva the delay in effectuating the provisions in regard to opium-smoking occasioned stormy debates, almost resulting in an impasse. A protocol was signed, with the abstention of China, postponing any further measures, in accordance with article 6 of the Hague Convention, to a period of not more than 15 years from the date when a commission shall have decided that the export of raw opium from producing countries no longer constitutes an obstacle to a reduction in the use of prepared opium. The representatives of the USA and China withdrew from the second Geneva conference partly on the ground of failure to prohibit or restrict the use of "prepared opium" and also because of the failure to limit the production of opium (and coca) to medical and scientific needs only.

A writer in the *Times* of Dec. 11 doubts both the possibility and the advisability of totally abolishing opium-smoking in the Far East. He takes the view that opium-smoking is rather more injurious than cigarette-smoking, but less so than the habitual consumption of alcohol, and argues that by forcibly depriving the Oriental of something for which his par-

1. *J. exp. Med.* 1943, 78, 67.
2. Munoz, J. M., Braun-Menendez, E. and Fasciolo, J. C. *Amer. J. med. Sci.* 1940, 200, 608.
3. Edman, P., von Euler, U. S., Jorpes, E. and Slöstrand, O. T. *J. Physiol.* 1942, 101, 284.
4. *J. biol. Chem.* 1943, 147, 135.
5. *Ibid*, 1943, 147, 143.
6. *J. exp. Med.* 1940, 71, 29.
7. *Anal. Acad. Biol. Univ. Chile*, 1940, 3, 83

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ticular constitution craves we may turn an amiable, introspective, hardworking labourer into a bellicose egoist, besides bringing back the smugglers and dope pedlars and opening up further fields for the illicit consumption of morphine and cocaine. The attitude of the Indian Government, following the Royal Commission of 1895, was to emphasise the evils of opium-smoking while justifying the prevalent Indian habit of eating opium, which the commission spoke of as the universal household remedy. But from 1912 onwards, in view of the appalling excess of production of opium and its products over any conceivable legitimate requirements, it has been evident that cultivation of the poppy and the production of raw opium must be reduced. The recent announcement in the House of Commons[8] that it has been decided to adopt the policy of total prohibition of opium-smoking in the British and British-protected territories in the Far East which are now in enemy occupation and not to restore the government monopolies of prepared opium therein is highly gratifying. An ingenuous critic might be led to inquire why this salutary step was not taken while the territories in question were in British possession or under British protection. Indeed the British representative at the Geneva conferences had in his report called attention to the fact "that a very considerable proportion of the revenue of certain of the Crown Colonies is drawn from the traffic in opium for smoking, which is a criminal offence in the self-governing parts of the British Empire and which His Majesty's Government is internally bound to suppress." The reply of the Colonial Secretary also referred to steps to be taken to limit and control the production of opium and promised that the Government will consult with the governments of other countries concerned with a view to securing their effective coöperation in the solution of this problem. This too should gratify America. At last it seems that the fundamental prerequisite for the efficient restriction of opium and its derivatives to legitimate medical and scientific purposes is recognised to be the limitation of opium production.

OTHER PEOPLE'S THUNDER ON THE LEFT

THE Communist Party has produced a memorandum on a national medical service[9] submitted to the late Minister of Health last August. One may hope Mr. Brown studied it carefully, for, while it contains little new, it has picked out from other plans much that is good. Indeed it is a strangely moderate document: with Left and Right rapidly approaching each other, the centre of the road may soon be uncomfortably crowded. The Communists want a whole-time service, but are prepared to start off on a part-time basis. Their major authorities are regional health boards, elected by constituent local authorities; but these are transitional bodies only, pending the creation of multi-purpose directly-elected regional authorities. Health workers come on to the boards as non-voting members. Each board has a regional health office with six divisions—environmental medicine, epidemiological services, hospitals, health centres, mental health services, and industrial medicine. The present local authorities retain their medical officers of health, but their public health departments are stripped of all clinical functions, though they would still coöperate in epidemiological control. Health centres and divisional health centres (the medical centres or local hospitals of Medical Planning Research) are on familiar lines. An original suggestion is that the first step towards periodical health examinations should be the examination of adolescents before they start work for the first time. It is recognised that much industrial medicine should be done by general practitioners working part-time; so it is suggested that every student should have some training in industrial medicine, while postgraduate facilities should also be widely available. No radical variations from Medical Planning Research proposals are made with regard to hospitals. At the centre there is still the Ministry of Health, balanced on either side by a Central Medical Board to look after wages, appointments, and conditions of service, and an elected Medical Advisory Committee.

8. See *Lancet*, Nov. 20, 1943, p. 651.
9. Central Books Ltd., 2, Parton St., London, W.C.1. 1s.

CLINICAL TRIALS OF SULPHAMERAZINE

SULPHAMERAZINE, a monomethyl derivative of sulphadiazine whose pharmacology has already been discussed in these columns,[1] is absorbed readily from the alimentary canal but excreted slowly, so that an exceptionally high and persistent blood concentration can be maintained with moderate and fairly infrequent doses, its chief clinical advantage. On a basis of equal blood concentrations, its therapeutic activity and toxicity are closely similar to those of sulphadiazine. The solubilities of sulphamerazine and of its acetyl derivative are greater than those of sulphadiazine and of acetyl sulphadiazine, so that the risk of blockage of the urinary channels ought to be less than with sulphadiazine. Its therapeutic action in cerebrospinal fever and pneumonia has now been studied by Gefter, Flippin and their collaborators[2] in Philadelphia. They treated 45 patients with cerebrospinal fever, 36 of whom were adolescents or adults. An initial dose of 3 g. of sodium sulphamerazine was given intravenously and then 1 g. was given by mouth every four hours until the clinical symptoms had disappeared; the average total dosage was 56 g. during 9·5 days. With children smaller doses were used. The average plasma concentration of sulphamerazine was about 13–16 mg. per 100 c.cm.; but since the compound is unevenly distributed between plasma and red cells, this figure cannot be directly compared with figures for blood concentrations of the other sulphonamides. There were only 3 deaths, giving a case-fatality of 6·7%, 2 of the patients being almost moribund when treatment was started. The case-fatality for cerebrospinal fever in Philadelphia during 1936–42 was about 40–57%, and in a previous series treated with sulphadiazine it was 12·5%. But the fatality varies so much from one epidemic to another that too close a comparison cannot be made between these different figures. With this high dosage toxic symptoms were not uncommon—they occurred in 11 of the 45 patients; 6 had skin rashes, 4 drug fever, and 1 acute loin pain and gross hæmaturia on the 14th day after taking 77 g. of the compound. This last case demonstrates that sulphamerazine may cause blockage of the urinary passages, in the same way as the other sulphonamide compounds do, even though (as in this series) a large fluid intake is maintained. Another report on the use of sulphamerazine in the treatment of meningococcal meningitis is given by Lepper, Sweet and Dowling,[3] who treated 22 cases with sulphamerazine, and 22 alternate cases with sulphadiazine. The dose employed was somewhat higher than that used by Gefter and his colleagues. The therapeutic action of the two compounds was practically identical (case-mortality 9·1% in each series) and so was the toxicity. Three of the 22 patients on sulphamerazine had renal complications, and one of them required cystoscopy.

In a lobar pneumonia series reported by Flippin, Gefter and their colleagues 80 patients were treated with sulphamerazine and 80 with sulphadiazine, alternate patients being assigned to either compound as they were admitted. For this infection the dosage was lower,

1. *Lancet*, 1943, ii, 296. Welch, A. D., Mattis, P. A., Latven, A. R., Benson, W. M. and Shiels, E. H. *J. Pharmacol.* 1943, *77*, 357.
2. Gefter, W. I., Rose, S. B., Domm, A. H. and Flippin, H. F. *Amer. J. med. Sci.* 1943, *206*, 211. Flippin, H. F., Gefter, W. I., Domm, A. H. and Clark, J. H. *Ibid*, p. 216.
3. Lepper, M. H., Sweet, L. K. and Dowling, H. F. *J. Amer. med. Ass.* 1943, *123*, 134.

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an initial dose of 3 g. being given by mouth (or by intravenous injection in severe cases) and then 1 g. every six or eight hours until clinical improvement was established; the average total dose of sulphamerazine was 23 g. during six days. With sulphadiazine an initial dose of 3 g. was given by mouth and then 1 g. four-hourly, the average total dose being 31 g. spread over seven days. The average plasma concentration of sulphamerazine was about 11–13 mg. per 100 c.cm., while that of sulphadiazine was 8 mg. per 100 c.cm. Apart from a slightly quicker defervescence among the patients treated with sulphamerazine, the clinical results of the two treatments were practically indistinguishable both as regards therapeutic efficiency and freedom from toxic reactions. Six of the patients on sulphamerazine and 8 of the 80 on sulphadiazine died. Toxic reactions were negligible, 4 out of the 160 patients having transient vomiting, 7 microscopic hæmaturia and 3 drug fever.

Similar experience is reported by Hall and Spink[4] who used sulphamerazine in the treatment of 116 miscellaneous infections. They found its therapeutic activity and toxicity to be similar to that of sulphadiazine, a lower dosage being required to produce the same result. It was less toxic than sulphanilamide, sulphapyridine or sulphathiazole, but sulphathiazole appeared to be more effective in the treatment of staphylococcal infections. In spite of its solubility being greater than that of sulphadiazine, sulphamerazine caused symptoms of urinary blockage in 2 of these 116 cases. One of the cases required ureteral catheterisation; the trouble in this case may have been brought on by a high acidity of the urine, owing to the administration of ammonium chloride. Hall and Spink recommend that all patients should be given enough fluid to maintain a large flow of urine and enough sodium bicarbonate to make the urine alkaline. Another series comprising 103 patients with miscellaneous infections has been recorded by Hageman and others,[5] whose therapeutic results with sulphamerazine compared favourably with those obtained with sulphadiazine and a lower dosage was adequate to maintain comparable blood levels; 3 of the 103 patients had gross hæmaturia. Altogether sulphamerazine seems much the same as sulphadiazine in practice, but it may be somewhat more economical and more convenient to administer.

PROTEIN REPLACEMENT AFTER BURNS

SUCCESS in the treatment of burn shock seems to depend chiefly on early and adequate replacement of lost plasma proteins, and subsequent maintenance of a normal plasma-protein level. Speed in the treatment of burnt people is partly an administrative problem, which can best be solved by coördination of the ambulance service with appropriate hospital facilities. At all hospitals materials and staff for immediate intravenous infusions must be constantly available and the staff should be warned in advance that the patient is coming. For the replacement of plasma proteins no real substitute for plasma has so far been found. Parkins and his associates[6] have lately compared the effect of gelatin solution with plasma in dogs subjected to standardised severe burns, and found that, though hæmoconcentration was as well controlled with gelatin as with plasma, the plasma-infused dogs survived much longer. They believe that some factor may be found in plasma which, when added to gelatin, may make it as effective as plasma in maintaining blood-pressure and thus saving life. However this may be, the present need is that every hospital which may have to treat burns should keep a sufficient supply of plasma; and as the intervals between cases of severe burns are apt to be long, it is generally convenient that this plasma should be in the dried form which keeps indefinitely. Dried serum serves the same purpose.

To maintain the plasma protein at a normal level over long periods of recovery is less easy than it appears. A detailed study of nitrogen metabolism following burns by Taylor et al.[7] showed that, to bring the plasma-protein percentage to normal and thus relieve œdema in the later stages of the treatment of burns, some patients needed supplementary feeding by stomach-tube and veins up to a daily protein intake of 500 grammes. In one case, during seven weeks a positive nitrogen balance equivalent to 6000 g. of protein was required to raise the plasma-protein level to normal and relieve œdema; in this case no impairment of liver function was noted. It is clear that more work is wanted along these lines, and if all hospitals cannot be equipped for protein estimations it looks as though all severely burnt patients should be evacuated to those that can undertake them.

INDUSTRIAL HEALTH EXPLAINED

THE Industrial Health Research Board has carried out much fundamental research and has published many detailed reports on the factors that promote or prevent efficiency in the worker. The board's findings, however, have not been applied in practice as quickly as they might have been, and some critics have maintained that the reports, which are presumably designed to be read by directors and works managers, have been written too much in the phraseology of the statistician and the physiologist. A busy works manager, they point out, is unlikely to be moved by the niceties of a correlation coefficient. Evidently the Board has taken this reproach to heart, for it has now issued the first of a new series of pamphlets[8] giving in non-technical form the main facts discovered by their investigators. This pamphlet has two sections, the first on "ventilation and heating" and the second on "lighting and seeing." It will be followed by others; indeed it is proposed that in future the results of any important new research in industrial health shall be published both as a comprehensive scientific report and also more briefly in everyday language. The authors of the first pamphlet have made a careful selection of the important facts about ventilation, heating, lighting and vision, and include some excellent photographs. One picture shows a blacked-out foundry with artificial "windows" fitted in the roof by putting fluorescent tubular lamps behind window panes; these "windows" are said to have desirable psychological effects on the workers and they are recommended for wider adoption in war-time factories. Other photographs show examples of good and bad lighting of factory workrooms and also methods of natural and mechanical ventilation.

Wing-Commander KENNETH ROBSON will deliver the Goulstonian lectures at the Royal College of Physicians of London on Thursday, Jan. 13, Tuesday, Jan. 18, and Thursday, Jan. 20, at 2.30 PM. His subject is to be primary pleurisy with effusion.

IN recognition of their work on penicillin Prof. ALEXANDER FLEMING, FRS, and Prof. H. W. FLOREY, FRS, have jointly received an award from the American Pharmaceutical Manufacturers' Association for contributing most to the advancement of medicine in 1943. Last Monday night, in a broadcast from Washington, Major-General Kirk, surgeon-general of the United States Army, expressed his congratulations, and Professor Fleming, as discoverer of penicillin, replied. Thanks to much work on both sides of the Atlantic, he said, his baby penicillin was growing up with phenomenal rapidity. He foresaw a time when infections now untouched would be conquered by more powerful new derivatives.

4. Hall, W. H. and Spink, W. W. *Ibid*, p. 125.
5. Hageman, P. O., Harford, C. G., Sobin, S. S. and Ahrens, R. E. *Ibid*, p. 325.
6. Parkins, W. M., Koop, C. E., Riegel, C., Vars, H. M. and Lockwood, J. S. *Ann. Surg.* 1943, 118, 193.
7. Taylor, F. H. L., Levenson, S. M., Davidson, C. S., Browder, N. C. and Lund, C. C. *Ibid*, p. 215.
8. Conditions for Industrial Health and Efficiency. Issued by Industrial Health Research Board of the Medical Research Council. Pamphlet No. 1. HM Stationery Office, 1943, 3d.

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Special Articles

SOCIAL INSURANCE AND NEUROTIC DISORDER

RECOMMENDATIONS OF RMPA

Sir William Beveridge's proposals on social insurance bear directly on mental health in the coming years. Feeling that much will turn on the way they are implemented, the Royal Medico-Psychological Association have prepared a memorandum discussing in detail how they might be applied so as to foster a healthy mental outlook, as well as physical well-being, in our country. The substance of some of their chief recommendations is set out below, with a few words explaining how they were reached.

1. An efficient mechanism to re-establish the unemployed in industry as soon as possible would be the most important factor in alleviating the psychological distress and illness due to "want." The duration of unemployment which may be unavoidable and so, of necessity, "allowed" or "condoned" by the scheme should be less than the period after which active job-hunting leads to a phase of active psychological stress, and should never be long enough for the final apathetic "broken" stage to develop; studies should be undertaken at a suitable time to determine the usual durations of these periods in England.

That the unemployed man goes through such phases has been shown by studies already made. At the loss of his job he experiences an initial phase of shock, followed successively by periods of active job-hunting, anxiety and apathy. During the anxious phase, it seems, he is still capable of being settled in a job, and a satisfactory remedial scheme would not let him go beyond this stage without finding him work. In the final apathetic stage he becomes fatalistic, sometimes resentful, and adapts himself within a narrower field.

2. With full employment and a comprehensive medical service, the so-called unemployable without physical disability will usually be a psychiatric as well as a social problem.

Roughly speaking, the less able members of the population are the first to be affected by unemployment—those who are less intelligent, less skilled, or less ready to adjust themselves and persevere. Psychiatric disability is likely to be commoner in this group than among those who have been able to fit in with the ordinary demands of life.

4. Safeguards against malingering must not be allowed to impair the efficient working of the scheme.

Wilful counterfeiting of illness is not found to be a problem, probably because of the immense capacity of the mind to deceive itself. Schemes can therefore safely be planned for the benefit of the many rather than to counteract the failings of the few.

Work is essential to mental health and the Beveridge report assumes that employment will be maintained; the memo suggests that insurance against loss of work as well as loss of income might be considered as part of the scheme. The offer of a training course after six months' unemployment does not meet the case. A plan for keeping a pool of employed workers which absorbs immediately all who become unemployed would have a better effect on mental well-being. Labour could be drawn from this pool as it was needed. The choice of work on leaving the pool should initially be made by the applicant after he has been advised on the occupations available, and been told what they entail—that is, he would have some simple vocational guidance. Unpleasant work should carry compensatory advantages. Those falling out of employment should be examined to find out the cause, and the information so collected should be analysed.

6. A flat benefit rate is a sound principle, but also requires, if it is to further mental health, a minimum wage standard, provision to cover rent adequately, and no exception such as that suggested for injured workers (i.e. those not permanently disabled), and for the aged during the transitional period of 20 years.

Fear of not being able to pay the rent is a cause of anxiety and neurosis, and should be eliminated either by full means to cover it, or by some equalisation of rents. In dealing with the injured man the memo suggests that we should only consider how badly he has been hurt and what can be done for him, without linking these things to the question of who is to carry the responsibility. For accidents due to employer's negligence an injured person can recover damages at common law. On psychiatric grounds the memo suggests that the damages which can be collected for any such temporary disability should be restricted, so that the prolongation of temporary illness cannot bring financial advantage to the sufferer. Thus the defendant's responsibility would be mainly for treatment and rehabilitation rather than for compensation.

7. Earnings extra to the benefits should be permitted, with medical approval and supervision, for any only partly disabled, in order to encourage the most effective rehabilitation—suitable adjusted work.

In the interests of both patient and nation any man who can work without harm to his disability (even though entitled to benefits) should be encouraged to do so. Workers should therefore be allowed to keep what they earn, and social security payment should not be reduced, the RMPA consider, until the total receipts exceed (say) 66–90% of the usual earnings. There would thus be a clear advantage in taking work. For the same reason training benefit should be at a higher rate than flat disability or unemployment benefit.

Subjects who, "through weakness or badness of character," fail to comply with the conditions for insurance benefit will pass to the care of the National Assistance Board. Such cases, the RMPA feel, may reasonably be dealt with on the basis of a means test: but it is unlikely that different financial treatment will cure the character defect. The memo suggests that psychiatry can help here.

8. War service disabilities should be dealt with as a special variety of industrial injury.

This would avoid disputes about whether the disability was really due to war. Any disability occurring in employment involving war risk (e.g. in the armed forces) or arising out of war risk, whatever the employment at the time, should qualify people for this benefit.

9. Old age should be dealt with as a disability (either partial or complete according to the age reached, unless there is overriding medical evidence, and payments, unless based on complete disability, should be uninfluenced by continuance at work.

The memo points out that there is no justification other than an actuarial one for treating the elderly differently from those of working age. The claims of the aged are comparable to those of the partially or totally permanently disabled, and they should be entitled to a pension equivalent to loss of earning power. Retirement should not be the condition required before payments can begin.

11. Care of injured workers under the proposed scheme should lessen the tendency to neurosis. Abolition of lump-sum payments and concentration on the provision of adequate medical care and social rehabilitation are desirable for the same reason. Much that is at present dealt with by litigation should be referred to medical tribunals.

Many psychoneurotic states are caused or aggravated by the Workmen's Compensation Act. The prospects of a lump sum may lead a man to prolong an incapacity and disturb his social life, while failure to receive what he expected may leave him bitter, and his anxiety symptoms are aggravated by worry. The proposal in the Beveridge plan that liability should fall on the state, and that lump-sum payments should be abolished, would, the memo suggests, permit of the same disturbing situation in a modified form.

If neuroses are to be avoided compensation must begin at the time of the accident; furthermore occupation counteracts preoccupation. Each case, the memo suggests, should be under the care of a social worker who will act as a link between patient, hospital and employer. Emphasis should be on the physical environ-

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ment, which should be made safe, rather than on minor signs of disease in the workers. Oft-repeated medical examinations are alarming and favour hypochondriasis.

12. The details of administration, whatever scheme is adopted, should be so devised that their psychological effects on the individual will be favourable.

The memo recalls that much of the stigma attaching to the Poor Law in the last century derived from the atmosphere, and the buildings, in which it was administered. The labour exchange should not only do the work, but have the aspect, of a human self-respecting and respected public service. Men should not be provoked by often-repeated questions or discouraged by unnecessary delays. And both doctor and patient deserve some alleviating measures over the question of certificates.

13. There should be a committee which . . . will concern itself with all persons receiving benefit longer than a stated period. Psychiatry should be represented on this advisory committee.

Some patients may seem to be unemployable, and some may develop what is called in the memo, for convenience, "benefit neurosis." Those in the first group will be mainly cases of mental deficiency and psychopathic personality and must be allowed for; and every possible effort must be made to prevent cases of the second type developing. The next two recommendations suggest how.

14. Any individual who has been receiving benefit longer than the stated period should have his case referred to an officer, with specialised social training, who will have medical advice at his or her disposal; and whose business it will be to decide whether the worker should be examined by a psychiatrist. There should be arrangements for the psychiatrist to review persons with a persistent illness whenever there is doubt whether this illness is sufficient physical cause for their disability.

15. The scheme envisages various methods—e.g., placement by employment exchanges, re-training and rehabilitation, for facilitating re-entry into employment—and these will need coördination. The normal method of re-entry via the employment exchange should entail some form of vocational guidance, and a social worker should coördinate this with the other methods mentioned, since the whole procedure involves watching what is medically advisable to what is available.

Psychopaths and defectives, it is felt, could not be dealt with adequately at the training centres without spoiling the atmosphere; and the memo suggests that a rehabilitation centre might be set up to deal with the more difficult "fit unemployables."

LENGTH OF GESTATION

SEARCHING the literature diligently Dr. Kenneth has found some 350 references to gestation periods in animals varying, alphabetically, from the agouti to the zebra. The results of these labours have been issued by the Imperial Bureau of Animal Breeding and Genetics and form a useful book of reference.[1] The information given comprises the average period recorded for different species by different workers, and, when available, the minimum and maximum times that have been noted. When the "average" is based upon a single observation Kenneth draws attention to the fact, but beyond this he passes no comment upon the worth or scale of the data. Circumstances, he says, prevented such inclusions. Even for the domestic cat, for instance, the average times given by different observers vary by as much as 20% (from 52 to 63 days) and one would need to consult the original data to find reasons for such discrepancies. Kenneth makes it easy to do so, but it would have been an advantage to have had the number of observations contributing to the figures and thus some scale of relative values for them. For a description of the variability round the average the standard deviation would also have been useful but this was presumably lacking in the original papers.

1. Gestation Periods, a table and bibliography. J. H. Kenneth, MA, PH D. Oliver and Boyd. Pp. 23. 2s.

Messrs. CALFOS Ltd., 15, Kingsway, London, W.C.2, have a limited number of pocket diaries (1944) which they offer to doctors who send 1d. stamp.

In England Now

A Running Commentary by Peripatetic Correspondents

I ESTIMATE that there were forty head in the waiting-room. With my partner and dispenser both down with 'flu I had to get on with it. "First one, please," I shouted. It was Mrs. Blight, multiloquent, menopausal and melancholy, wanting one of her periodic long chats about her blood-pressure. I steeled myself to listen. The telephone rang. Would the doctor please to call to Frogmire to see maister, missis and three children all to bade? I hung up and turned to Mrs. Blight. "You were saying——?" The telephone rang. Would the doctor come at once to Withywind (five miles in the opposite direction) to see granfer who was took turrible tight on his chest? I replaced the receiver. Some of the coughs in the waiting-room sounded ominously like growls. "I'm sorry, Mrs. Blight, you were just saying——?" The telephone rang. Would the doctor . . . Eight times did I try to hear Mrs. Blight's old old story and eight times were we interrupted by that dreadful bell. At the ninth ring I smiled a rueful smile. "We don't seem to be getting on very fast, do we, Mrs. Blight?" There was a certain forced brightness in my tone. "Perhaps you'd like to wait a few days till things are a little easier." (A fond and pious hope.) Mrs. Blight rose reluctantly more in sorrow than in anger, and then, as one conceding graciously and much, "Very well, doctor," she said. To the accompaniment of the tenth ring I bowed her out.

* * *

In spite of several long spells of wool-gathering, I got the impression that the lecturer was definitely in favour of efficiency. Not for the first time I felt grave misgivings in all directions. Finding myself opposite him at tea, I plucked up courage, "Sir," I said, "This business of efficiency—how can it be acquired? *Can* one acquire it? or is one just born with it or without it, like red hair?" He laughed teethfully. "No, I should say it is an acquired characteristic. You can't blame your chromosomes. It's an acquired characteristic which can be developed by practice." "I'm not blaming anything, Sir," I replied patiently. "You see, I'm not sure I admire or envy the efficient person any more or less than I admire or envy the chap with red hair. My point is this. Obviously some people have got it and others haven't. If it's a question of development, then some people can develop it more easily than others can, like a facility for ball-games. It must be inherent in their pattern." "Ye-ss. I suppose that may be so." ". . . and so, Sir, must a total lack of it in others?" "Oh come now, I can't imagine anyone being totally inefficient!" "Can't you really, Sir?" I said, "Well I can. In fact, I myself am totally inefficient and always have been. No, please don't apologise or anything. My earliest memories are of being chided for it by parents and siblings; only it was called Irresponsibility in those days. Masters at school beat me up for it as a dreary sort of routine. It was preached at me hard throughout my tender formative years without the slightest effect, except of course to make me feel inferior. But I managed to get over that in time."

The man was obviously interested. He proffered his cigarette case. My lighter worked at the first attempt. I gazed at it with genuine astonishment. "That does happen sometimes, Sir," I explained apologetically, "but not often. Usually the trains I look up turn out to run on Saturdays Only; I find unposted letters in my pockets weeks afterwards; I can never remember people's names or telephone numbers; my best salutes come off when I'm not wearing a cap. It's transmissible too, you know, Sir. My boy is just the same; he's known as Dopey in his Scouts. And yet we manage to get along all right, have lots of fun. Life is one series of glorious unexpected adventures. And now after years and years of inefficiency I am told I must acquire efficiency. You know, Sir, I'm a bit frightened, because I'm afraid it can't be done."

He became very kind and encouraging. "Aren't you being too modest?" he asked. "Modest? Not a bit of it, Sir. There are other qualities besides efficiency, don't forget. Goodness is one; piety is another—*San Luis Rey*, you know—and, I would add beauty, too.

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I don't mean mere physical beauty. I'm sure one can have a beautiful nature without being efficient. Just because I am deficient in one particular quality, and one which I have long since debunked to my own satisfaction, doesn't bother *me*. I might just as well weep because I haven't got red hair. I can take it. But it looks as if the Army won't be able to. What do you think, Sir?" "What did you do in Civvy Street?" he asked, anxious to make a diagnosis of some sort. I told him. "Oh come. I can't imagine that you are so very inefficient if you can run a show like that. It's inconceivable." "I'm not so sure that I did run it, Sir," I said, "I rather think it ran me. I had clerks and secretaries and things to look up my trains and see about letters being posted and all that. Expensive? I know; but nothing like so expensive as if I tried to do that sort of thing myself. My own work was purely clinical. . . . But let's get back to efficiency in the Army. Is it any use pretending to be efficient? Do you think I could do that and get away with it. Like dyeing red hair black?" He frowned thoughtfully and I wondered what he was going to prescribe. "No," he began slowly, "I should say it's no good pretending to be anything you aren't. You'd get found out very quickly. But I do think a —er—conscious lack of efficiency can be concealed. A man who displays keenness in his job and interest in his men can't fail to get on." A brace of contradictions and a non-sequitur seemed to brighten him up no end, and he proceeded apace, "I always maintain that a man who always tries his damnedest and puts up the best show he's capable of . . ."

But he was becoming lyrical just like he was in his lecture; and I suddenly remembered something else. "But, Sir," I cut in as soon as it was decent, "Let's take that business of getting to know the men, and asking them about their wives and children, and wanting to see their photographs—is that really necessary? I mean, need I do it?" "Of course there is no necessity, my dear man," he replied, "but you will if you're wise. You'll find it a damned useful tip I can assure you from personal experience." "Well Sir, you really do surprise me," I said. "My own feeling is that it would be an impertinence. I'd never dream of going into all those matters unasked even with my closest friends. They may have seven wives and four hundred children apiece for all it concerns me. And I know I personally should feel pretty snooty if anyone of any rank whatsoever started interrogating me on my private life. In fact I can imagine a unit—of chaps of my persuasion—getting utterly exhausted and going on strike because of these tender inquiries. Can't you imagine our back-stage conversation in the barrack-rooms? 'New subaltern arrived in camp tonight, chaps. Parade tomorrow with family photographs at the trail'?" "No, I can't," he snapped, and I couldn't help wondering whether something had gone wrong with his sense of humour. (Moreover, what the Bellman said three times was true, I reflected.) "I wonder," I mused aloud, "about this business of imagination. Is it acquired? *Can* one acquire it? Or is one just born. . . ."

But he had left the table. All my misgivings returned. I was not being a success. He wouldn't remember because he was in his pram at the time, but the one thing which the last war proved conclusively was that I should never make an efficient soldier. I ought to have told him that. I resumed my woolgathering, and forgot all about the evening PT parade until it was too late. I learned afterwards that when my name was called three colleagues answered, "Here, Sir," and one gabbled "Excused-PT-doctor's-orders"; which wasn't so very efficient either.

* * *

My job is definitely a Good Thing, but it has Some Bad Features, chief among which is that it involves getting up at about 6.30 AM. For years I have not seen the sun rise because I went to work too late. Now I don't see it because I go too early. The other day we started late (at 9.15) and I did see the sun rise and was most impressed by the forgotten phenomenon. The workers at the factory start at 7 AM and finish at 6 PM, so *we* can't complain. The assembly shop is a most impressive sight, with all the aircraft facing up to the far door, through which they will go when finished. It is an enormous shop, with I don't know how many planes in it (and of course I wouldn't say if I did), their tails and fuselages separate at first, and both skeletons, then getting clad in their outer coverings, then joined together, and so on through all the final stages until at the far door they are complete and ready to take the air at the flight-shed just across the road. A macabre lot the human beings: they have yellow skin and purple lips, with any facial veins showing up as purple, owing to the mercury-vapour lighting. Incidentally I doubt very much whether this is a good form of lighting for factories, since—at any rate here—there is a good deal of glare.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

THE debate on the Labour amendment to the address showed a House prepared to be conciliatory and constructive and yet ready to be critical of the lack of definition in Government proposals for dealing with the strategy of peace. Now that the Government have declared that the time has now come for definite proposals for postwar legislation to be put forward, the House wishes to see these proposals as soon as possible in the form of bills for discussion. Since the declaration of peace prospects, as one may say, there have been three stages in the Government's presentation of their views. Stage one is the general adumbration of an idea, of which Assumption B in the Beveridge report that we need a comprehensive and unified medical service is an example. The second stage is the white-paper which serves as a basis for Parliamentary discussion. The third stage is a bill embodying specific proposals. In general, apart from education, the House has not yet reached the white-paper stage. The white-paper on the medical services is still delayed to some time "early next year" and any prospect of a bill is in the indeterminate future, but the Education Bill is to appear before these notes reach my readers.

The most interesting debate last week was on the second reading of the Disabled Persons (Employment) Bill. Mr. Tomlinson spoke in a forthright and interesting way on the practical application of rehabilitation on a large scale. The Minister's speech stressed the psychological and sociological aspect of rehabilitation. To contact a man in hospital shortly after an accident and let him know that someone is interested in his recovery, waiting to help him and ready to train him may do more than anything else in making the skill of the surgeon effective. The first clause of the bill is comprehensive. It defines a disabled person as one "who, on account of injury, disease, or congenital deformity, is substantially handicapped in obtaining or keeping employment or in undertaking work on his own account." This includes not only the victims of war or accidental injury, but those handicapped by such disabilities as blindness or tuberculosis. The Minister mentioned Papworth with approval and the bill makes it possible for every tuberculosis hospital to adopt the Papworth method of post-treatment training. Rehabilitation after accident or injuries has been widely extended during the war. Once established as a generally recognised method of treatment it is not likely that we shall allow it to lapse. The Minister spoke as though rehabilitation was a discovery of his department but it is in fact the application of medical and surgical knowledge over a wider field than has hitherto been possible because of the lack of hospital facilities and the necessary organisation.

In the debate on reconstruction problems in the House of Lords Lord Woolton confined himself to a cautious general review and he said nothing about a medical service. Lord Horder assured his listeners that the medical profession were anxious to help on Assumption B but said he thought we should begin with the machine and not the man who drives it. In the voluntary hospitals we have "a large body of highly efficient well-administered institutes." Teamwork is based on hospitals and modern medicine is teamwork. The machine should be improved by regionalising hospitals. Lord Horder's scheme was: regional hospitals, setting up centres to deal with positive health, and expanding

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the NHI to include dependants. This would be better than making the doctor a civil servant. Parliamentary opinion would probably be that this scheme was not comprehensive, for it does not deal with the public-health services, with those of the education authorities or with industrial medicine. There are indeed many fields to be covered, and as the white-paper stage of medical reorganisation is postponed to next year will it be possible to introduce and pass a bill commanding general consent? The probabilities point to a temporary compromise.

FROM THE PRESS GALLERY

Back at Scratch

IN the House of Lords on the second day of the debate on reconstruction Lord HORDER (speaking as one of Lord Woolton's advisers at the Ministry of Food during the last four years) said he was sure the Minister of Reconstruction could face possible disasters in the economic field with as much success as he had done in the field of the country's nutrition. It might be appropriate, Lord Horder continued, to remind the Government at this moment that they were back at scratch in the matter of the health services. A white-paper had been promised, and it would be encouraging if they could be told that it would be forthcoming soon. He understood from Lord Woolton's speech that they had to look primarily in the matter of health services to the Ministry of Health, and in the name of the medical profession he welcomed Mr. Willink as the new minister. Though he spoke for no official body Lord Horder felt certain that, as a profession, doctors were anxious to help in implementing Assumption B, which had already received in principle the Government's support. He was a little surprised and disappointed when he learned that the new Minister of Reconstruction would not initiate policy. He would like to feel that at least Lord Woolton was free to suggest policy, and would keep a watchful eye on the negotiations between the Government representatives and the bodies representing the profession and the voluntary hospitals. (Lord WOOLTON interposed that what he had said was that the *primary* responsibility rested with the departments for formulating plans, and he was certainly free to suggest policy.)

Lord Horder expressed his satisfaction that there would be conference and suggestion (he would not use the word guidance) in regard to the reorganisation of the medical services; consideration as to how the conversations should take place, how the stage should be set, and possibly beginning not with the doctors—not marching the doctors up the hill and marching them down again, and then pausing as if to say, "I have made a beginning in reorganising the health services." Lord Horder thought that to begin with the machine rather than with the man who drove the machine might next time be more fruitful of results. As regards the machine they had in the voluntary hospitals a body of efficient, well-administered institutions. Modern medicine was teamwork, and teamwork was based on hospitals not on individuals. Therefore until there was proper linking, extending from the domiciliary medical service up to and including the big teaching and research centre based on a university, a large part of the doctor's time, especially the country doctor's time, would be absorbed in making the necessary contact to get what his patient required. Until the machine was improved by regionalising the hospitals, the body of skill and knowledge in medicine would not be available to the citizens. Doctors had been pressing for years that the dependants of the workers should be included in the national insurance scheme. He thought it had been worked out actuarily to mean something like £9–10 million a year. The worker's anxiety because he had no feeling of security as to the treatment of his dependants would be relieved at once if the same facilities were given to the dependants as to the workers. Health centres, preventive medicine, positive health—that was becoming a cliché, but they were doing nothing about it. It would not be difficult to duplicate and triplicate—in fact to do one hundred times over—what was done at Peckham ten years ago with great success. Peckham, the pioneer health centre, had unfortunately gone into cold storage, but this should not be a parochial effort, it should be a national effort. Regional hospitals, setting up centres for dealing with positive health, expanding the national insurance scheme to include the dependants through larger contributions—by these means the reorganisation of the medical services could be obtained more satisfactorily and quickly and with less bitterness of heart than by saying to the doctor, "We wish you to be a civil servant." He did not think it was in the public interest to convert the medical profession into a civil service, and he thought by now the public shared that feeling. But if they were going to hand over the hospitals to local authorities, and hand over the doctors as well, ought not something to be done to prepare the local authorities for exercising those new powers? He had already reminded their lordships of the efficiency of the large voluntary hospitals. Was it to be wondered at that quite early in one of the conversations—so he was given to understand—there was a feeling that a proper spirit of partnership was not being exercised between the representatives of the local authorities and of the voluntary hospitals, and so the conversations broke down? Now they were back at scratch, and a great opportunity was offered to the new Minister of Health, backed by the sympathetic support, suggestions and even guidance of Lord Woolton.

The White Paper

In the House of Commons on Dec. 7 replying to criticisms in regard to the length of time which the Government were taking in making public their policy in regard to the Beveridge report, Sir WILLIAM JOWITT, Minister without Portfolio, reminded the House that Beveridge took 18 months to prepare his scheme. He had the benefit of a lot of highly skilled civil servants assisting him, but he had the great advantage of not having to get their agreement in drafting his report. He made three assumptions—full employment, children's allowances and a comprehensive medical service. Did the House say that the Government, just because Beveridge was a very eminent person who knew a great deal about the subject, should accept his report with the remark, "Sir William Beveridge says so; therefore it must be all right"? Nobody would say that, and so the Government thought it right to examine his conclusions. In their investigation sometimes they came to the conclusion that Beveridge was right, and they had spent a good deal of time in proving that he was right. But they had to fill in the details and *they* were not able to make assumptions. For instance, they had to turn the phrase "comprehensive medical service" into a reality. He regretted the delay in the issue of the promised white-paper, but he hoped that early in the New Year they would be able to produce it. The House would see that they had covered a vast field of work. In many cases they had confirmed Beveridge's conclusions; but they had not slavishly copied them; in many cases they had, in fact, reached their own conclusions, and they thought they were better. But he begged those who had been talking glibly about the Government having murdered the report, or buried or mummified it, or who had been saying that the Government scheme was a thing of shreds and patches, to wait for the white-paper, because all these allegations were simply not true.

Replying to questions, Sir W. Jowitt said that there would be two or more white-papers—certainly one on the comprehensive medical service and possibly one on a workmen's compensation.

Rehabilitation and Resettlement

In the House of Commons on Dec. 10 Mr. G. TOMLINSON, parliamentary secretary to the Ministry of Labour, in moving the second reading of the Disabled Persons (Employment) Bill, said the object of rehabilitation was to fit a person for employment which he could keep in normal competition with his fellows. War-time experience had proved that it was possible for all but a small minority of the disabled to find work. The bill did not provide for medical rehabilitation, which would naturally develop as part of a comprehensive medical service. The proposals fell under three heads: first, courses of industrial rehabilitation to tone up the disabled person before he returned to his former employment or took a vocational training course in a

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new occupation; secondly, a statutory obligation upon employers to accept a quota of disabled from a national register which would be set up; thirdly, the creation of special facilities for the minority who required sheltered conditions. The bill was intended as a permanent addition to the country's social services and was designed to cover the casualties of peace as well as war, of industry as well as the battlefield.

QUESTION TIME

Reorganisation of Health Services

Replying to questions, Mr. H. WILLINK stated that the white-paper on the reorganisation of health services is in preparation. He must have sufficient time to study closely the many difficult issues involved, and for that reason it was not yet possible for the date of publication to be fixed, but there would be no avoidable delay.

Mr. H. MCNEIL: Do I understand the Minister to inform us that he is initiating new conversations, and that he will not produce the white-paper which was previously in draft?—Mr. WILLINK: No new consultations are being initiated, but the questions involved in this matter are of first-class importance and of great complexity and great delicacy, and I should not be doing my duty unless I put forward to my colleagues proposals for which I feel I can take the fullest and most real and personal responsibility.—Mr. GRAHAM WHITE: Can the Minister give us a little bit of enlightenment as to the period of time? Will it be six months or next year?—Mr. WILLINK: I hope it will be quite early next year.—Mr. G. C. HUTCHINSON: Will this House have an opportunity of debating the white-paper after it has been published?—Mr. WILLINK: Yes, sir.

Major B. E. NIELD asked the Secretary of State for War if he was aware of any approach having been made to members of the medical profession now serving in the Army to ascertain their views upon the question of a state medical service; and if, when the white-paper upon the subject was issued, he would facilitate arrangements whereby their views might be expressed.—Sir JAMES GRIGG replied: The answer to the first part of the question is no, and to the second part, yes.

Medical Man-power

Sir LEONARD LYLE asked the Minister of Health if he was aware that owing to the calling up of doctors engaged in practice among civilians, there was increasing difficulty in securing medical attention, especially when Government war enterprises requiring labour were brought into any district; whether he could give an assurance that present arrangements would be adequate to deal with an epidemic; and whether he would arrange for the coöperation of service doctors stationed in the area, but at present relatively unoccupied, to assist in civilian work.—Mr. WILLINK replied: The necessity of supplying the Forces with doctors must in certain areas cause some inconvenience to the public, although every effort to mitigate this is made in selecting doctors for recruitment and arrangements are made to secure that essential medical attention will be available. The Service Ministers have always been ready to give what help they can from their medical departments and in the present epidemic they are coöperating in arrangements under which their medical officers will give as much help as their essential service duties permit to general practitioners, factory doctors and hospitals in urgent need.

Sir L. LYLE asked the Minister whether he would, in consultation with the departments concerned, investigate the possibility of forming a pool of medical men attached to the services in any particular area in this country to ensure that the number was kept at a minimum and their time and experience fully utilised.—Mr. WILLINK replied: A suggestion for pooling medical officers of the Services has already been explored by the Medical Personnel (Priority) Committee. The committee recommended that coöperation between the medical departments of the three Services, already carried out to a considerable extent, should be developed to the highest possible degree, but they felt that complete pooling would not be practicable.

Sir RALPH GLYN asked the Minister whether he would consult the medical committees of the London general hospitals as to steps to be taken to meet the most recent requirement of doctors to join the Services, thus reducing the hospital staffs to a proportion which did not provide civilian patients with proper medical treatment; and, in view of the fact that there was now an average of only one doctor to every 3000 civilians, what was the proportions of doctors to men in the Services.—Mr. WILLINK replied: My medical officers will be prepared, as always, to consult with, and so far as possible advise, any hospital which is in special difficulty with regard to medical staff. The decision to accelerate the recruitment of a certain number of recently qualified doctors holding house-appointments in hospitals affects far less than half the total of doctors holding such appointments, although in individual hospitals the proportion may be as high as half of the house officers. The house officers are, of course, only a proportion of the medical staff of a hospital and I am advised that the recruitment referred to should not result in depriving civilian patients of essential treatment. The average number of civilians per general practitioner is rather less than 3000 over the country as a whole.

Tuberculosis Allowances

Mr. STEPHEN DAVIES asked the Minister if he would now, in order to avoid confusion and make it more effective, extend his scheme of allowances to tuberculosis sufferers and their dependants so as to include non-pulmonary and chronic cases.—Mr. WILLINK replied: The special arrangements were authorised to enable persons to give up work temporarily for treatment which is in the interest of the public health no less than their own. The association with the war effort which has been the justification in such cases for making repayment from Exchequer funds under emergency powers is not applicable to the other cases referred to in the question, but the fact that certain limitations must on this ground apply to such repayment from the Exchequer does not affect the power of local authorities to grant assistance within the scope of their statutory powers, and I shall be glad to consider in consultation with representatives of local authorities how the objective of ensuring adequate assistance can most effectively be secured.

Control of Voluntary Hospitals

Dr. E. SUMMERSKILL asked the Minister what measure of control he exercised over the policy of voluntary hospitals, in view of the fact that public money was now used to subsidise wages in these institutions.—Mr. WILLINK replied: I assume that the question relates to the Exchequer assistance available to hospitals in respect of additional expenditure incurred as a result of their adopting the recommendations of the Nurses Salaries Committee. The only condition attaching to the receipt of grant is that the recommendations of the committee shall in fact be observed.

University Grants Committee

Mr. T. E. HARVEY asked the Chancellor of the Exchequer the nature of the changes made in the University Grants Committee and the names of the present members.—Sir J. ANDERSON replied: I have increased to fifteen the number of members of the committee, in order that their advice to the Government on the important problems that lie ahead may be based on the widest range of experience. Before the war the committee numbered ten, but had been reduced by deaths and resignations to five. Arrangements are being made to hold the first meeting of the new committee at an early date. The following is a list of the members of the committee:

Sir Walter Moberly, LITT D (chairman), Mr. E. A. Benians, LITT D, Prof. W. E. Collinson, PH D, Sir Charles Darwin, SC D, FRS, Miss Margery Fry, LL D, Sir Robert Greig, D SC, Prof. A. V. Hill, D SC, FRS, MD, Mr. P. D. Innes, D SC, Sir Frederic Kenyon, D LITT, Prof. P. S. Noble, Principal Andrew Robertson, D SC, FRS, Prof. E. J. Salisbury, D SC, FRS, Prof. J. C. Spence, MD, Prof. R. H. Tawney, LITT D, Sir Henry Tizard, FRS, FRAES.

Mr. HARVEY: Do the rules still preclude members who are in the employment of universities from being members of the committee?—Sir J. ANDERSON: That rule has been changed.

Tuberculosis in Belgium

In answer to a question, Mr. DINGLE FOOT said that according to his information it was correct that 109,511 supplementary ration books were issued in Belgium in February, 1943, to persons certified to be suffering from tuberculosis.

Deaths in Greece

Replying to a further question, Mr. FOOT stated that precise figures of deaths in Athens and Piraeus during October are not yet available. In the opinion of the Swedish supervisors of the relief scheme the figure of 1800 deaths resulting from starvation or undernourishment is incorrect. It is possible however that the total number of deaths from all causes during October was in the neighbourhood of 1800.

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Letters to the Editor

COMMON SENSE IN ANÆSTHETICS

SIR,—We agree with part of Dr. Mallinson's article in your issue of Dec. 11, but we cannot allow to pass unchallenged his almost hysterical condemnation of ether, nor some other statements which would be dangerous if the inexperienced anæsthetist were to accept them at their face value. The ether charts produced by Dr. Mallinson are striking, but whether they incriminate the administrator or the agent is open to question. At the Radcliffe Infirmary we use ether extensively in routine lists, in major thoracic surgery and for gravely shocked patients, and have had no cause to regret having done so. Records are kept and there is a member of the staff whose sole duty it is to visit each case daily until their discharge to make sure that immediate or remote postoperative sequelæ are not overlooked.

That we are not alone in our views that ether properly used is not as lethal as Mallinson suggests, is shown by the following two extracts :—

> That realist Trueta,[1] referring to the qualities required in an anæsthetic for operations performed under war conditions, writes : "*The anæsthetic which fulfils these requirements most closely is ether.*" The italics are Trueta's.
>
> Halford,[2] referring to anæsthesia of the Pearl Harbour casualties, finishes up his article with the following paragraph : "It was the consensus of all civilian surgeons concerned, that, considering all the hazards of patient, anæsthetist and anæsthetic, open drop ether still retains the primacy ! "

'Pentothal,' properly used, is an excellent drug, but Mallinson's reference to it as "almost entirely non-toxic" and his statement that its use is the safest way of avoiding the "terrible mortality" of other methods is not in accordance with the fatalities which have followed its use. Halford, writing on the use of pentothal for Pearl Harbour casualties, states : "let it be said that intravenous anæsthesia is an ideal method of euthanasia." That a misuse of any drug can have grave consequences is common knowledge and applies as much to pentothal as to any other drug ; indeed it has been aptly said : "It is fatally easy to give an overdose of pentothal."

Mallinson says that postoperative pulmonary complications are commoner after ether than after other agents. This, again, is at variance with modern views clearly expressed by Brock,[3] Marshall[4] and Bird,[5] who show that whether the patient develops a postoperative chest condition or not depends primarily on whether the abdomen is opened or not. In support of his contention Mallinson refers to Kaye's[6] figures from the Middle East, but on looking up the reference we find that what Kaye really says is "The patients . . . suffer from dust—and—tobacco pharyngobronchitis which is almost universal amongst soldiers. . . . Further, it is the abdomina and near-abdomina in which respiratory movement is restricted by after-pain (such as herniotomy or gunshot wounds of the chest wall) in which respiratory sequelæ have developed ; limb cases, tonsillectomies and the like have thus far come off scot-free." We have not investigated Mallinson's other references.

It is profitless to compare figures for postoperative "chests" of different anæsthetists because of the varying diligence and frequency with which these complications are sought, and the yardstick by which they are deemed worthy of recording. Mallinson would appear to have achieved a world record if out of his 170 abdominal cases the only chest complications were two "slight bronchitis" and one "ateléctasis" ; an alternative explanation is that the mesh of his net was large.

We are well aware of the virtues inherent in modern forms of local and general anæsthetics expertly exploited. In our hospital pentothal and cyclopropane are in daily use, and in abdominal cases regional anæsthesia is employed almost routinely to give the necessary relaxation. The present-day world, however, is beset by practical difficulties. Inexperienced anæsthetists now have to undertake the responsibility of anæsthetising their fellow men on board ship or in the desert where conditions are far from ideal. Mallinson's technique of combining in the one patient pentothal, spinal analgesia and nitrous oxide no doubt gives good results used by himself in ideal circumstances, but is hardly to be recommended to the novice in the pitching destroyer or in the desert tent. His achievement in dispensing with ether in any circumstances could be equalled by a similar bigoted attitude on our part claiming that any operation could be done (barring the explosion hazard) under ether only.

While we do not doubt his admirable results with his elaborate technique and apparatus, we do feel he is wrong to suggest that it is heresy for anyone to use ether. As you suggest in your leading article in the same issue (p. 737), the skill of the anæsthetist is more important than the agent used, and we hold that equally good results are obtained from most of the anæsthetic drugs in common use, provided they are expertly administered. If the experienced anæsthetist is not available it is highly desirable that the method should be a safe one, and surely no-one doubts that ether offers a greater range of safety than any other anæsthetic. It is probable that many more patients would be alive today if "modern anæsthetics," despite their excellence in the hands of those who know how to use them, had not been discovered.

R. R. MACINTOSH.
Oxford. WILLIAM W. MUSHIN.

1. Trueta, J. Principles and Practice of War Surgery, London' 1943, p. 140.
2. Halford, F. J. *Anesthesiology*, 1943, 1, 69.
3. Brock, R. C., *Guy's Hosp. Rep.* 1936, 86, 1.
4. Marshall, G. and Foster-Carter, A. F. *Practitioner*, 1943, 150, 71.
5. Bird, H. M., Kilner, S. D. and Martin, D. J. *Brit. med. J.* 1943, i, 754.
6. Kaye, G. *Anesth. & Analges.* 1941, 20, 238.

TUBERCLE AND THE CHILD

SIR,—In your annotation of Nov. 6 under this heading (p. 577) appears the following sentence :—

"A year ago the incidence of tuberculous meningitis had risen by a half and it may be more now ; in London the death-rate from pulmonary tuberculosis in 1941, as compared with 1938, was quadrupled in children under 4, and trebled in children between 5 and 14—the accuracy of the population figures having been carefully checked."

These figures of death *rates*, as Dr. Allen Daley and Mr. Benjamin point out (*Brit. med J.* 1942, ii, 417), depend "upon the accuracy of population estimates." Are we not on firmer ground if we take actual numbers of deaths instead of death-rates ? Published figures are as follows:—

Age-group	London *				Administrative County of Lancaster †				England and Wales ‡			
	1938	1939	1940	1941	'38	'39	'40	'41	1938	1939	1940	1941
0– 4	30	15	22	41	3	8	10	6	153	132	150	250
5–14	25	16	24	25	9	8	15	9	262	226	279	301
15 +	2535	2619	2641	2486	790	798	851	823	20867	21184	23233	23081

The source of the figures in the above table is :
* *Brit. med. J.* 1942, ii, 417.
† Supplied to Lancashire County Council by Registrar-General.
‡ Report of the Committee on Tuberculosis in War-time (MRC No. 246).

The 1942 figures for London have just been published (*Brit. med. J.* Dec. 4, p. 713). In the age-groups 0-4 and 5–14 there were 39 deaths. In 1941 66 and in 1938 55. Thus, the almost astronomical increases in the death *rates* in the annotation are based on the fact that 66 children died from pulmonary tuberculosis in London in 1941 as compared with 55 in 1938. Further comment appears superfluous.

Lancashire County Offices, Preston. G. LISSANT COX, Central Tuberculosis Officer.

THE COMMON COLD

SIR,—The most effective method I have found of aborting colds is, directly the well-known unpleasant feeling of an incipient cold comes along, to take about a teaspoonful of saline or a weak antiseptic into the mouth, tilt the head back as far as convenient and let this liquid run as far down the throat as possible without swallowing ; then, while still holding the head back, cough violently. This causes a sort of explosion in the throat which throws the solution over the surface of the throat generally, and also—which is apparently more important—over the internal surface of the nasal cavity. The dispersed liquid apparently dilutes any mucus lying on that

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surface, for a considerable quantity may be blown out into a handkerchief although this was impossible before. Repeat this process every two hours. I find that it aborts a cold completely within a day or a day and a half, whereas otherwise it would have lasted a week or more. I call it the "explosive gargle", and I have found it far more effective than ordinary gargling or any form of nasal spray. I understand that nasal sprays are to be used for the administration of patulin, so perhaps this idea may be useful.

Spalding, Lincs. E. PICKWORTH FARROW.

THE NURSE IN CHARGE

SIR,—Your leading article mentions one of the difficulties in the medical treatment of the junior nurse. Most adults, when they feel the need of advice, can go direct to a doctor. Surely the nurse should be able to do the same, without the intervention of the nurse in charge and the home sister? When the probationer reaches the doctor she may be shy of discussing her affairs before a sister and, as you say, in the absence of a spectacular rise in temperature, she may feel that she is considered to be making an unnecessary fuss. In such an atmosphere it is difficult for the doctor to do his best for the patient.

I believe the junior nurse would be more likely to seek early treatment and to benefit by it, if her contact with the doctor were direct. If she wished, she should be able to take a friend with her and the family doctor relationship should be established as nearly as possible.

Oxford. VICTORIA SMALLPEICE.

THE NURSE'S PAY

SIR,—The scales published in the second Rushcliffe report have received the approval of the general press and the nursing profession will welcome them as a whole, but there are inconsistencies, particularly in regard to the salaries of ward sisters and women staff nurses. As your annotation of Dec. 11 (p. 740) points out, discrimination in favour of men is very marked, and as before the ward sister comes off poorly. Under the London County Council, the male student nurse, when he becomes state-registered, gets a higher salary in his fourth year of training than the ward sister in her first year, and the staff nurse in her tenth year in that grade (i.e., after fifteen years of service). In the same way, the male charge nurse, who corresponds to the ward sister begins under the LCC at a salary of £300 6*s*. a year, while the ward sister's maximum only reaches £300 after ten years' service in that grade; and the male assistant nurse after only two years' training starts at a salary of £232 14*s*. a year, while the ward sister with probably four years' general training, and at least one year's experience as a staff nurse, only begins at £230. Surely the fully qualified woman should receive more than the less highly qualified man. You note that the health visitor receives a higher salary than the district nurse; she also has the advantage over the ward sister. Under the LCC a health visitor receives £300 a year rising to £390 a year compared to the ward sister's £230 rising to £300. A health visitor in the provinces gets £270 rising to £360. The report states that the salary is designed to induce suitable candidates to enter and stay in this branch of work: surely it is equally important to induce suitable persons to become ward sisters.

Nursing Times. KATHARINE F. ARMSTRONG, Editor.

SPINA BIFIDA, HYDROCEPHALUS AND OXYCEPHALY

SIR,—It is with pleasure we read your leading article of Nov. 27, not only because you envisage a more hopeful prognosis in suitable cases by reason of endoscopic electrocoagulation and other means, but also because you focus attention upon aspects of these diseases which are so little known. However, we suggest that the subject is even more intricate than you describe. Thus it is not generally appreciated that the "convolutional thinning" to which you refer in association with craniostenosis is equally common in cases of spina bifida and hydrocephalus, and is sometimes seen even in normal infants. Indeed, it is doubtful if the thinning is "convolutional," since careful examination shows that the areas of thinning do not correspond in position to the gyri, and also they differ markedly in radiological appearances from those seen in "thumbing" of the skull, which are due to convolutional pressure in known cases of cerebral tumour, &c. In many cases, such as myeloceles, the intracranial pressure cannot be increased and yet the "convolutional thinning" may be very pronounced; other evidence of raised pressure, such as the increased size and width of the fontanelles and sutures, may not be present, the thinning having been shown to be independent of whether the sutures are closed, exaggerated, or normal in width. Moreover, the bone formed between the areas of thinning may be twice as thick as the normal skull, so that pressure atrophy cannot be the whole story. Finally, this "convolutional thinning," which has been called craniolacunia or craniofenestria according to its degree of development, offers a valuable guide to the prognosis of operations, and will help other surgeons to select favourable cases and to approach the excellent figures of Ingraham and his associates, which you quote.

Manchester. J. BLAIR HARTLEY.
Isleworth. C. W. F. BURNETT.

Obituary

JOHN MICHAEL BARKLA

MB EDIN, FRCSE; FLIGHT-LIEUTENANT RAF

J. Michael Barkla was born in 1915, two years after his father Prof. C. G. Barkla, a Nobel laureate, had left the Wheatstone chair of physics in London to occupy the chair of natural philosophy in Edinburgh. Michael entered Merchiston Castle School in 1925 where he took a prominent part in games and in the musical activities of the school. He was wing three-quarters in the first xv, and in his last year won the 100 yards and the quarter-mile, equalling the school record in the former. But after entering the medical school of the university in 1933, he gave up all formal athletics, and in the vacations walked and climbed with student friends in this country and on the Continent. His university course was a series of successes. In 1938 he was awarded the Ettles scholarship as the most distinguished graduate of the year, and in the following year the Allan fellowship for clinical medicine and clinical surgery. After graduating he worked at the Royal Infirmary as clinical assistant and house-physician to Dr. Fergus Hewat and as house-surgeon to Prof. J. R. Learmonth, later becoming clinical tutor. For a time he lived at the Eastern General Hospital, where he was resident surgical officer—to deal if need be with civil air-raid casualties. He was also university demonstrator of anatomy under Professor Brash from 1939 to 1941. In the autumn of 1942 Barkla joined the RAF and the following spring he went to North Africa as surgeon with a mobile field hospital. He spent a short time working in the hospital on Lampedusa, but after returning to the neighbourhood of Tunis he lost his life in a motor accident.

Ferbury, Edinburgh

Professor Learmonth writes: "With Michael Barkla's intellectual ability went practical capacity and wise judgment of uncommon degree; and all these gifts he wore with a modesty that was an example to those less fortunate. He gave scrupulous care to every aspect of his work, and gained at once the respect and the confidence of those shrewdest of judges, his patients and his students. When he left to go on service, he had a fine record in the surgery of emergencies, and these practical successes depended as much on his devotion to his patients as on his operative dexterity. He was a gay and stimulating colleague, whose untimely death robs the Edinburgh school of a career that could not but have adorned it, and his associates there of a lovable friend."

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Public Health

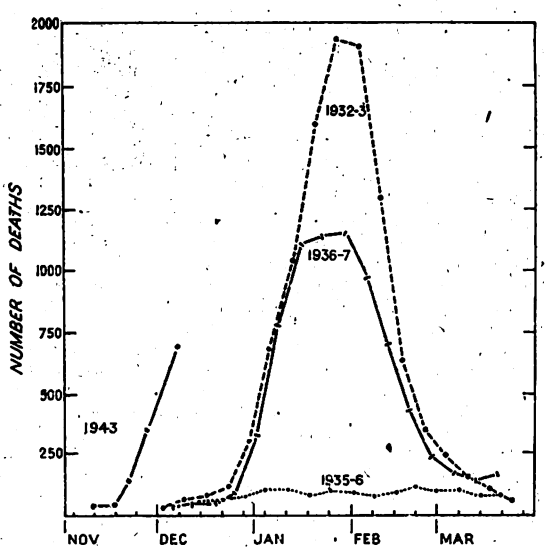
THE INFLUENZA EPIDEMIC

In the week ended Dec. 4 the Registrar-General for England and Wales was notified of 709 deaths in the great towns attributed to influenza, the largest number reported in a single week since Jan.–Feb. 1937; the R.-G. for Scotland was notified of 50 deaths. It should be remarked at once that it was chiefly the elderly who died, the age-incidence for the 72 London deaths being 0-1-0-0-2-3-3-8-11-18-26, with no hint of the shift-to-the-young of the epidemic of 1918, the fourth year of the last war. Available reports all speak of short sharp attacks, with few complications and rapid convalescence, although the hardship of wide-spread illness at such a time as this has been keenly felt. The epidemic was unexpected because the story of a 4-yearly cycle was still widely believed, despite the non-appearance of a peak in 1941, and the fact that a regular cyclical recurrence was unknown in other countries.

Week ended	AGGR.	Lond.	Grtr Lond.	NORTH	MIDL.	Manc.	B'fd	B'hm	B'tol
Nov. 13	46	6	16	19	12	4	2	2	4
20	106	10	16	56	24	4	7	1	9
27	375	29	71	172	81	44	17	20	18
Dec. 4	709	72	181	288	157	47	11	57	16

Weekly deaths from influenza in the great towns of England and Wales.

The course of the epidemic in various parts of the country can be seen at a glance from figures extracted from table 3 of the R.-G.'s returns for the last four weeks. They confirm the impression that in the Northern area, where it started, the epidemic shows signs of abating, whereas the peak is not yet within sight in the Midland area and in Greater London. For the aggregate figures of the country as a whole the incidence curve has become less steep, the rises being × 2·3, × 3·5, × 1·9 for successive weeks on the previous one. It would be unwise to predict what height the peak will reach, but a comparison



Course of present epidemic of influenza alongside those of 1933 and 1937.

with the completed course of the 1933 and 1937 epidemics (shown on the accompanying graph) suggests that 1943–44 will come to rest somewhere between the two.

MEDICAL CARE ON THE FLU FRONT

Asked in the House of Commons on Dec. 9 what steps he was taking, in view of the shortage of doctors and nurses, to mitigate the severity of influenza attack the Minister of Health said he had made arrangements with the Services for temporary deferment of the call-up of doctors. In the difficult conditions of war-time, he added, we must all help one another and in consultation with official and voluntary organisations he had made suggestions for special help in the home, not forgetting the provision of meals. In a circular letter with the same date Sir Wilson Jameson put the initiative on the county or county-borough MOH, suggesting that some such scheme as the following might prove practicable.

General practitioners and factories with doctors in urgent need of assistance would apply to the secretary of the Local Medical War Committee stating the kind of help required —e.g., holding surgeries or visiting patients. The Secretary of the Committee, if satisfied as to the urgency of the need, might telephone the request to the County MOH unless it had been decided to decentralise the arrangements to the District MOH. The County MOH will apply to the ADMS (or the District MOH to the appropriate officer, probably to a particular military medical unit in the neighbourhood). In some areas the Secretary of the LMWC should apply to nearby military medical units direct.

The Regional MO is discussing with the Royal Naval and RAF medical authorities the machinery to be adopted if help is required from them, and he will inform the County MOH of the arrangements to be made.

PROBLEMS IN THE HOME

For helping suffering households the Secretary to the Ministry has asked local authorities to consider how temporary assistance can be given by the diversion or adaptation of existing services,—e.g., first-aid post or rest centre personnel, health visitors, school-nurses.

The Ministry of Food and the Board of Education will permit arrangements on a payment basis for the provision of meals from British restaurants and school canteens, with as few restrictions as possible for the next few weeks. Where transport is a problem Civil Defence ambulances and vehicles may be used, or any existing organisation for the transport of meals to agricultural workers. Local voluntary organisations and individuals of goodwill may be able to assist. Where such arrangements are insufficient meals may have to be provided from rest centres or mobile canteens, with the consent of the Divisional Food Officer.

Maternity and Child Welfare authorities have powers to provide home helps; the Red Cross Society, the St. John Brigade and the WVS have offered to help within their scope on request from medical practitioner, district nurse or hospital. The organisation for mutual help after air raids may be on a sufficiently definite basis for voluntary offers. Nursing help within the home, possibly by way of assistance to the district nurse, or at hospitals, may be provided by the whole-time staff and volunteers in the first-aid post and rest centre service. The rest centre service might also provide volunteers for other help within the home and solve the difficulties of shopping with reduced deliveries and the need to present ration books. Additional help might be forthcoming from the local youth services.

It is inevitable that for all these domestic matters arrangements will vary from place to place. Doctors and nurses should therefore keep in touch with the local MOH.

Local Colour

Influenza in the *West Country* has been extremely widespread and characterised by a sudden onset—some patients have been struck down in the streets. Generally the disease has run a short and uncomplicated course, requiring absence from work of about a week or 10 days. Fever up to 103° F. has been usual but temperatures of 105° F. or over have sometimes been noted, especially in children and young adults. The pyrexial phase is usually over in 3 or 4 days. Bronchial catarrh has been an almost universal complication; gastro-enteritis and sinusitis have been not uncommon; bronchopneumonia rather rare; œdematous pharyngitis and acute otitis media rarer still. A few days' rest in bed in a warm room, with a little reassurance from the doctor, provide all the treatment necessary in most cases, though it must be admitted that many busy and conscientious persons have worked through the disease without apparent ill effect. Asthenia and a tendency to sweat easily have been tiresome features of convalescence. Relapses have so far been rare and not often serious. Apprehension has been

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as well-marked as ever and pneumoniphobia rife. In a word, this disease continues to prove alarming and exhausting to the patient, and boring to the doctor. The peak, or at any rate one peak, now appears to have been passed.

In *Aberdeen* there is a widespread epidemic of upper respiratory infections, with varying patterns of coryza, sore throat and tracheo-bronchitis, the cases being on the whole much milder than in the Midlands. There have been no cases of the grave form of influenza seen in the 1918 epidemic, and apart from pneumonia the only complication which seems at all common is acute otitis media. In the fatal cases sulphonamides have lowered the temperature but have had no effect on the pulse-rate or toxic symptoms. For the week ending Dec. 11 there were 6 notified cases of influenzal pneumonia and 7 deaths, and 5 deaths from non-pneumonic influenza; these figures show a fall from the week before, when there were 10 deaths and 19 new cases of influenzal pneumonia and 5 deaths from non-pneumonic influenza.

As an example of conditions in the Northern area, in *Leeds* practitioners are working at high pressure. There is quite an epidemic of influenza, but so far it is a relatively mild illness lasting 4–5 days and with few complications. At the General Infirmary 64 out of the 432 nurses have been off duty with influenza in the last six weeks. Most of them had coryza and/or tracheitis and bronchitis; there were 3 cases of sinusitis and 1 of otitis media; no deaths. Some patients over 60 now being admitted to the Infirmary have developed either epistaxis or atypical pneumonia as a sequel to 'flu, and people have been admitted in a state of collapse after returning to work too soon after an attack. The rise in deaths certified as "influenza" is not very steep—the figure for week ending Dec. 4 was 12—but this may be accounted for by a tendency to certify under broncho-pneumonia or pneumonia instead. Notifications of influenzal pneumonia for that week totalled only 5, and doctors being influenza-conscious probably notify influenzal pneumonia more readily now than they did before the epidemic. So far there have been no cases of influenzal pneumonia clinically resembling the 1918 type, and the autopsy findings confirm this view.

In one *North-Western Area* the influenza has appeared in three types. The first, the "official" type, starts suddenly with malaise, headache, generalised pains and pyrexia; within 24 hours the victim is feeling better and in 3 or 4 days is able to return to work; there do not seem to be any unpleasant sequelæ. The second starts like the official type, but pyrexia often reaches 103° F. and takes several days to settle; if the victim tries to get up too soon the pyrexia is liable to recur; this type may last 7–14 days, and is accompanied by a painful and persistent cough due to tracheitis; the patient needs a period of convalescence and may be away from work for 10–20 days. The cough tends to be recurrent. Elderly patients may have an irregular rapid pulse. The third is a true influenzal bronchiolitis with patches of broncho-pneumonia. This is a severe type and has been responsible for some deaths in young as well as old patients. The illness starts as usual but in a day or two râles and crepitations appear at the bases, and gradually spread until most of both lungs is involved. The radiographic picture is of thickened bronchi with only a few small scattered patches of consolidation. The patient becomes severely cyanosed and requires oxygen almost continuously. Sulphonamides do not appear to have much effect. In fatal cases death occurs from respiratory failure within 7 days. In cases that recover, convalescence is slow; cough is persistent and troublesome. Patients with previous chronic bronchitis or other lung diseases seem specially prone to develop type 3. In this area it is type 1 that is most common; type 2 has occurred sufficiently frequently to be serious; type 3 has so far been unusual. This incidence is well-known to the lay as well as medical population and has caused some sarcastic comments on the Ministry of Health's attempts to minimise the outbreak. As the *Manchester Guardian* said; if you're still in bed after 2 or 3 days, you have only yourself to blame; you have allowed a virus not approved by Whitehall to get you!

Manchester is being visited by an epidemic which, if not to be compared with that of 1918 in severity, probably surpasses it in the number affected. Perhaps it is now on the wane, but in 1918 there was a mild onset, a remission in the number of cases, and then an outburst as unexpected as it was severe. The present attack has on the whole been mild, and the alarming feature in 1918, of young active folk being struck down with fatal result, has been absent. Deaths from influenza and influenzal pneumonia reported for the weeks ending Nov. 20, 27, and Dec. 4 were 4, 41, 39; but these figures give no idea of the numbers affected, for the disease itself is, of course, not notifiable. Perhaps this is good in view of paper shortage and for the sake of overworked practitioners who would have to fill in endless forms. Factories, business concerns and hospitals have been depleted of their staffs. A ward has had to be opened to take in sick nurses at more than one big hospital, and of an outpatient clerical staff of 7, only 2 arrived on one day. At one big works in the district 1200 workers were absent at a time. Doctors have also suffered. The most common type has been one with a three-day fever, followed by catarrh of the nose and chest. Many folk have had to return to work when a rest for convalescence would have been more fitting.

Infectious Disease in England and Wales

WEEK ENDED DEC. 4

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 2694; whooping-cough, 1757; diphtheria, 610; paratyphoid, 2; typhoid, 8; measles (excluding rubella), 451; pneumonia (primary or influenzal), 2291 (last week 1661); puerperal pyrexia, 136; cerebrospinal fever, 60; poliomyelitis, 4; polio-encephalitis, 1; encephalitis lethargica, 3; dysentery, 144; ophthalmia neonatorum, 52. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Dec. 1 was 2001. During the previous week the following cases were admitted: scarlet fever, 201; diphtheria, 43; measles, 9; whooping-cough, 73.

Deaths.—In 126 great towns there were 1 (0) deaths from an enteric fever, 1 (0) from measles, 5 (1) from scarlet fever, 16 (2) from whooping-cough, 21 (1) from diphtheria, 46 (5) from diarrhœa and enteritis under two years, and 709 (72) from influenza. The figures in parentheses are those for London itself.

Exeter reported the fatal case of enteric fever. Besides 57 deaths from influenza Birmingham had 5 from diarrhœa, 3 from whooping-cough and 3 from diphtheria.

The number of stillbirths notified during the week was 169 (corresponding to a rate of 29 per thousand total births), including 23 in London.

Births, Marriages and Deaths

BIRTHS

AUBERT.—On Dec. 7, at Nottingham, the wife of Dr. Edward Aubert—a daughter.

FAWDRY.—On Dec. 5, at Nicosia, Cyprus, the wife of Dr. Alan Fawdry—a daughter.

HOWARD.—On Dec. 4, in Norwich, the wife of Flight-Lieutenant Richard Howard, FRCSE, RAF—a daughter.

LODGE.—On Dec. 4, at Oxford, the wife of Surgeon Lieutenant F. E. Lodge, RNVR—a son.

O'DONOVAN.—On Dec. 6, in Dublin, the wife of Dr. D. K. O'Donovan—a daughter.

PRUNTY.—On Dec. 8, at Hindhead, the wife of Dr. Garnet Prunty—a son.

SMALLSHAW.—On Dec. 9, at Epsom Downs, the wife of Dr. D. B. Smallshaw—a daughter.

MARRIAGES

BENNETT—ALDRED.—On Dec. 4, at Wroxham, Ronald Campbell Bennett, MB, to Barbara Aldred.

LONGMORE—CENTLIVRES.—On Nov. 10, at Cape Town, John Bell Longmore, BM, surgeon lieutenant RNVR, to Virginia Centlivres.

DEATHS

GIBSON.—On Dec. 4, at Ealing, Francis Maitland Gibson, BSC, MB EDIN., formerly director of the King Institute of Preventive Medicine, Madras, aged 80.

GOSSAGE.—On Dec. 10, at Chertsey, William Herbert Gossage, MRCS, aged 75.

HITCHINGS.—On Dec. 8, at Oxford, Robert Hitchings, MRCS.

JACKSON.—On Dec. 6, at Boscombe, Hants, William Massingberd Middleton Jackson, MD DURH., DPH, late RAMC, formerly of Folkestone, aged 78.

KNEVITT.—On Dec. 9, Herbert Knevitt, MRCS, of Ealing Green, aged 76.

LAUDER.—On Dec. 7, at Southbourne, Bournemouth, Thomas Campion Lauder, MB EDIN., LRCPI, DPH, DTM, lieut-colonel RAMC retd.

SHARROD.—On Dec. 9, Arthur Richard Sharrod, MB LOND., of Stourbridge, aged 56.

WILSON.—On Dec. 12, Roger Parker Wilson, CIE, FRCS, lieut.-colonel IMS retd.

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Notes and News

University of Cambridge

During November the title of the degree of MD was conferred on W. F. Young.

University of Dublin

On Dec. 8, at the school of physic, Trinity College, the degrees of MB, B CH, BAO were conferred on the following:

W. E. C. Allt, W. H. Ashmore, Mary B. Kelly, Harold Links, Mary E. G. Millidge, I. B. O. Ogun, Owolabi Onibuwe, Margaret S. O'Riordan, A. K. D. Rutherford, Sheila Sheehan, D. H. Sidebottom, J. T. Sweetnam, A. P. Whyte and F. B. B. Woods.

Royal College of Surgeons of England

At a meeting of the council held on Dec. 9, with Sir Alfred Webb-Johnson, the president, in the chair, Sir Girling Ball was appointed Bradshaw lecturer for 1944.

Diplomas of fellowship were granted to the following:

R. B. K. Rickford, George Wynn-Williams, K. W. Powell, G. B. Jones, M. D. M. O'Callaghan, D. M. Jackson, B. P. Moore, A. G. Leacock, H. E. Lockhart-Mummery, Robert Bewick, C. R. Rapp, H. D. Drury, W. G. Holdsworth, A. D. McLachlin, O. B. Dickinson, R. A. Christianson, Margaret R. Dix and J. D. Jones.

A diploma of membership was granted to T. A. Quilliam and diplomas in anæsthetics were granted jointly with the Royal College of Physicians to the following:

George Bellman, James Butler, J. A. Cochrane, Doreen M. E. Cranch, J. M. Cribb, H. W. Davies, R. G. B. Gilbert, L. M. Hampson, R. L. H. Harris, K. O. Harrison, Margaret Hawksley, R. A. C. Herron, J. T. Hunter, R. S. Kay, Rosalind S. McGowan, Dorothea B. I. Montgomerie, F. L. E. Musgrove, Albert Pearlman, J. M. Piney, E. N. D. Repper, Alison Ritchie, W. M. Shearer, R. G. Sheppard, W. J. Stevens, S. V. Strong, Helen M. Wood and J. W. Woodward.

Royal Faculty of Physicians and Surgeons of Glasgow

At a meeting of the faculty held on Dec. 6, with Dr. James MacDonald, the president, in the chair, the following were admitted to the fellowship: J. W. Affleck, Titlandhill, by Falkirk, qua physician; Thomas Fletcher, Cockermouth, F. M. Walker, Ayr, qua surgeon.

Medical Casualties

The following RAMC officers have been posted as prisoners of war: Captain J. S. Hamilton-Gibbs, MB EDIN.; Captain Colman-Nairnsey, MB DUBL.; Captain Harry Silman, MB LEEDS; Captain A. McN. Tomlinson, MB MANC.

Middle Class in Hospital

On Dec. 9 the London Hospital began a scheme for patients whose annual incomes do not exceed the following scale: married with dependents £750; married without dependents £600; single with dependents £600; single without dependents £400. For a weekly maintenance fee of six guineas these patients have full use of the laboratory services of the hospital, of the department of physical medicine and of an operating theatre. Charges for medical attendance have been fixed as follows: physician, 5 guineas for the first week, and 3 guineas a week thereafter with a maximum of 25 guineas; surgeon, 25 guineas for a major operation, 13 guineas for an intermediate operation, and 5 guineas for a minor operation; and similarly for the anæsthetist, 3 guineas, 2 guineas, and 1 guinea. These beds have been placed in a special ward of their own and the system of pay-beds in private wards will continue as usual.

Medical Textbooks for Malta

The British Medical Students Association have sent off eight cases of textbooks for the use of medical students in Malta. They have been collected in answer to an appeal from the vice-president of the students' representative council at the University of Valetta. Last year medical students in Malta attended lectures by candlelight in the hospital shelter. They had very few medical books, and those were grossly out of date. Since then a few copies of standard works have arrived, but most of the students still lack books. They have also been undergoing military training, so that quite exceptional difficulties have confronted them in their studies. Among the books collected in answer to the appeal by the BMSA are copies of new textbooks sent by the authors; and the whole consignment is made up of reasonably up-to-date works. The books are being sent with the coöperation of the Colonial Office and the Malta Government Office in London.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

More Beds at Queen Charlotte's?

The new premises of Queen Charlotte's Maternity Hospital at Hammersmith include an uncompleted nurses' home of 185 bedrooms, now used for storing furniture from bombed houses. The Ministry of Home Security have agreed to clear the furniture from half the rooms, and if these were made ready for nurses, the hospital could open 40 more lying-in beds. Lack of accommodation for nurses at present reduces the number of maternity beds from 200 to 86. The Bernhard Baron Memorial trustees will pay £30,000 towards the nurses' home provided it is finished by the end of 1944, and the hospital is seeking permission from the Ministry of Health to complete the work. Applications from nearly 3000 expectant mothers are refused each year.

National Smoke Abatement Society

At a conference held by this society in London on Nov. 5 to discuss smoke prevention in relation to postwar reconstruction resolutions were adopted calling on the Government to give the problem urgent and full attention with a view to "improving public health and amenities, reducing a gross economic waste, and assisting the better utilisation of our fuel resources"; particular reference was made to smokelessness in new housing and new installations of fuel-burning plant, increased production of smokeless forms of fuel and power, postwar electrification of railways and the establishment of smokeless zones in towns. A second resolution urged local authorities to appoint special committees to ensure full local examination of smoke abatement as it affects reconstruction and town-planning.

Health Conference at Westminster

At a conference called by the Westminster Trades Council on Dec. 4, attended by delegates from many organisations and by local citizens, Dr. Haden Guest, MP, introducing the speakers, emphasised the importance of mutual understanding of modern medicine between public and doctors. Dr. Joan McMichael drew from the audience many examples of the sociomedical problems that arise in an area like Westminster where there are hundreds of small factories and offices which could only be served by an industrial health service organised for the whole area. The wider subject of the future of the medical services having been outlined by Dr. R. R. Wilson, the conference agreed that a national health service based on health centres and available to the whole community is an immediate necessity and approved "a campaign to secure healthier conditions in factories, offices and other places of work, and to arouse the public to a sense of responsibility for their own health." The conference committee was instructed to take practical steps to improve the availability of hospital beds in the area, to endeavour to inaugurate a home-help service for the sick (felt to be particularly necessary in an area where so many office workers live alone) and to organise an industrial service for the factories and offices at present without one.

Similar conferences held or projected at Leicester, Birmingham, Derby, Staines, Islington, do not appear to have secured the same degree of medical collaboration.

Mr. FREDERICK RIDLEY will speak to the Clinical Society of the Royal Eye Hospital on Friday, Jan. 14, at 4.30 PM, on the tears.

PENICILLIN SYMPOSIUM.—The January issue of the *British Medical Bulletin* is to be a penicillin number, with short reviews by experts, abstracts of all the important British papers on penicillin which have been published between 1929 and 1943; and a bibliography of relevant papers not abstracted. Although the bulletin is normally published by the British Council for overseas distribution a small number of extra copies of this number will be available for doctors in this country. Application to the council at 3, Hanover Street, London, W.1, not later than Dec. 22.

Appointments

CULLEN, THOMAS, MB GLASG., DTM & H: examining factory surgeon for Frodingham, Lincs.

FLETCHER, DORIS, MD SHEFF.: medical referee for skin diseases in the county-court districts of Barnsley, Glossop, Pontefract, Rotherham and Sheffield (circuit no. 13).

GILLESPIE, E. HARPER, MB EDIN.: pathologist at the laboratory of Rotherham department of health.

SMALL, H. A. D., MB NZ., FRCS: temp. asst. surgeon to the Hospital for Sick Children, Great Ormond Street.

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ANXIETY NEUROSIS IN COMBATANTS

C. P. SYMONDS, D M OXFD, F R C P

AIR-COMMODORE; CONSULTANT IN NEUROPSYCHIATRY, RAF; PHYSICIAN FOR NERVOUS DISEASES, GUY'S HOSPITAL; PHYSICIAN, NATIONAL HOSPITAL, QUEEN SQUARE, LONDON

THERE is little difficulty in describing the symptoms of what is generally called an anxiety neurosis as they are seen in combatants, nor is there much doubt in most cases about the origin of this neurosis in a state of fear. It is much more difficult to give an account of the process by which fear, which may be regarded as a normal state, under certain conditions of flying or battle stress gives rise to the neurosis which must be regarded as an abnormal or morbid state. The most popular hypothesis at the present time is derived from the psychopathology of Freud and his followers. According to this hypothesis, anxiety is an affect which arises when as the result of emotional conflict there is frustration of instinctive desire. In the case of war neurosis, whether in flying personnel or other combatants, the conflict is between the instinctive forces of duty, self-respect and loyalty on the one hand and self-preservation on the other. This point of view is succinctly stated by Gordon and Hargreaves (1940) thus:

"In the last war it was said that soldiers broke down because they could not stand the strain of war, but it was really the strain of conflict between their self-preservation instinct and the demands of the ideal they had set themselves in respect of duty and self-respect. Such a conflict, whatever it be, will induce a severe sense of insecurity with its attendant emotion of anxiety. If the conflict is not resolved the anxiety continues. . . ."

Those who support this hypothesis generally assume that the sufferer is himself unaware of the nature of the conflict.

Curran and Guttmann (1942) say: "The sufferers (from anxiety states) are usually unaware of the nature of their conflicts or at least do not face them openly," though in a later publication (1943) they imply that an anxiety state may arise without conflict. Henderson and Gillespie (1940), who prefer the term "anxiety psychoneurosis" in order, apparently, to emphasise the correlation with a specified psychopathology, define a psychoneurosis as implying "either bodily disturbance . . . dependent in a way unknown to the patient on mental causes; or a mental disturbance not the result of bodily disease . . . which the patient realises to be abnormal and the meaning of which he is at a loss to understand." The nature of the affective disturbance resulting from this conflict is variously defined. Curran and Guttmann (1942) regard it "as a condition of fear not clearly focused on any special object"; James (1940) as an emotional state closely allied to fear; Henderson and Gillespie (1940) as "a state of morbid fear."

AN ALTERNATIVE CONCEPTION

These extracts are representative of a view which regards the anxiety neurosis or psychoneurosis as an affective state closely resembling if not identical with fear, having its origin in an emotional conflict of which the patient himself is partly or wholly unaware. In war the conflict is between fear and other emotional forces. A different conception is that which refuses to accept the doctrine of a specific psychopathology. According to this view the anxiety neurosis is a state of fear which is morbid only in so far as it is not adequately accounted for by the circumstances in which it is present. It is conceived simply as a disturbance of function in that part of the mind, or at that physiological level which is concerned with the generation of affect. No fixed pathology, whether psychological or physiological, is included in this conception. It is recognised that many factors may operate in the ætiology and that these may be hereditary, physical or psychical. An anxiety neurosis according to this conception therefore may be precipitated by cerebral injury, infection or intoxication, especially if there is inherited predisposition, without the existence of adequate psychical factors. It may equally result from psychical causes such as catastrophe or danger without any physical factor, or both factors may operate together. The exponents of this view regard the anxiety neurosis of war as a morbid state of fear developing out of a natural state of fear, allowing at the same time for physical factors such as exhaustion, infection or intoxication.

Thus Mapother (1935) stated that the anxiety neurosis of war "was an over-excitability of the fear mechanism and was constitutional, or the result of stress of special duration or severity, perpetuated by situations which had become conditioned stimuli in the particular individual." In his evidence before the Shell-Shock Committee (Mapother 1922) he had expressed a similar opinion with regard to shell-shock, stating that it was "due to mental strain or shock too prolonged or too intense for the particular individual to endure without the emotion becoming persistent. In some cases the strain or shock was quite inadequate to cause the resulting symptoms in a normal man, but was adequate for that individual on account of constitutional predisposition or acquired predisposition due to bodily causes such as infection."

Thus the anxiety neurosis of war has been explained by two quite different theories, one assuming a particular affective disturbance resulting from unconscious emotional conflict, the other assuming an undue intensity or persistence of fear due to over-stimulation of the fear mechanism. Both hypotheses have in common the assumption that fear is the original source of the neurosis.

TWO CONCEPTS OF ANXIETY NEUROSIS COMPARED

It is necessary for the argument at this stage to consider briefly the ways in which these two concepts have developed. The psychopathological theory is founded upon Freud's concept of the psychoneuroses as resulting from conflict between the libido and the ego. No attempt can be made here to explain in detail what is meant by these terms. Broadly speaking however the libido included all positive urges or desires which could possibly be associated with sexual relationships; the ego stood for the rest of the personality. In the infant the libido was unimpeded, but as the personality developed education and social pressure made conflict inevitable. As a development of this conflict a split occurred between the libido and the ego, the former together with the ideas and memories centred upon it being relegated to the unconscious and kept there by the barrier of repression. The libido could pass this barrier only in a form acceptable by its custodian the censor. Successful passage of the barrier was described as the process of sublimation and this process was the essence of mental health. Failure of sublimation was likely to result in a piling up of libido whose attempts to pass the barrier of repression were frustrated. Such frustration of the libido gave rise to a feeling of tension or affective disturbance, which constituted the basis of the anxiety neurosis. This theory, enunciated before the last war, supposed the conflict always to be between sexual urge and repression. During that war the frequent occurrence of anxiety neurosis under conditions in which it was quite clear that the source of the neurosis was fear led to modification of the theory by many of its exponents (Rivers 1924, Hart 1929). The anxiety neurosis according to this modification could result from frustration of any one of the instinctive forces, and under war conditions the instinct frustrated was that of self-preservation, not sex. The mechanisms of repression and sublimation however were the same as those which operated when the conflict was between the sex urge and other elements in the personality, and the resulting feeling of mental tension or anxiety was also the same. This last point is of considerable importance for it is on this assumption that statements such as those already quoted are based, to the effect that the anxiety neurosis of war is not directly due to the effects of fear but results from the battle within the individual. The symptoms of an anxiety neurosis are the symptoms of conflict; the one party to the conflict is the ego or personality; whether the other party is sex or fear the symptoms will be essentially the same. As has been seen the exponents of this theory are not always explicit as to the extent to which the scene of the conflict is confined to the unconscious, but incline to the belief that it is nearly all, or nearly always, unconscious so that the sufferer while aware of his symptoms is unaware of their cause.

This account of the psychopathological theory of anxiety neurosis is so brief that it cannot claim accuracy

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in detail, but must serve for discussion in the present context. It is a theory which has been widely accepted, and is assumed by many writers on the subject to be entirely satisfactory. The validity of this theory however has been subject to serious criticism, some of which is aimed at the fundamental structure of psychopathology. Hart (1929), for example, has pointed out that the evidence upon which the psychopathological theory of neurosis is based is derived not from the patient's statements or admissions but from the psychoanalyst's interpretation of these statements, and that the psycho-analyst may be biased by the tenets of the school to which he belongs. Mapother (1933) considers the conception of specific instinctive forces as a means of evading rather than meeting problems of fact.

Psychopathological theory can offer no explanation of anxiety neurosis following cerebral injury or physical illness, except by assuming that such physical factors are not of primary importance and that the true cause is to be found by the experienced analyst in unconscious conflict. The answer to this is that the experienced analyst starting with this assumption may, by bringing to the attention of his subject conflicts which may exist in the mind of anyone, find in them a causal significance which does not in fact exist. With regard to the anxiety neurosis of war, when this appears in its simplest form as a state of fear immediately following exposure to intense or long stimulation, of fear-evoking quality, the psychopathologist is obliged by his theory, as we have seen, to postulate an intermediate stage in which fear enters into conflict with other emotional forces with consequent generation of another kind of fear. A simpler explanation of the observed facts if valid would be preferable.

The alternative theory of anxiety neurosis relates it to other varieties of affective disorder, for example elation or depression, the criterion of morbidity being the inadequacy of the circumstances when fully known to account for the degree or duration of the affect as judged by normal standards. According to this view, as we have observed, the affective disorder may be precipitated in persons with inherited liability by a variety of physical causes as well as by emotional stimulation. When the latter is causally operative there is not necessarily correspondence between the quality of affect aroused by the emotional stimulus, and the quality of the resulting affective disorder, but—

"The nearest approach to a specific connection between the precipitating happening and the type of affective disorder is seen in the anxiety disorders which follow a terrifying experience such as exposure to shell fire" (Mapother and Lewis 1937).

It is obvious that terrifying experiences are much commoner in war than in peace. Therefore one would expect the anxiety neurosis of war to have its origin more often in terrifying experience than from any of the other possible causes.

It has been observed that this latter concept of the anxiety neurosis is descriptive and makes no attempt to explain the process whereby normal fear is transmuted into morbid fear. I have attempted (Symonds 1941) an explanation in physiological terms based upon the analogy of pain.

One of the objections which may be levelled at the hypothesis of the direct development of an anxiety neurosis from fear is that as the result of a terrifying experience fear very often does not appear immediately but after an interval, or if it does appear immediately it is of only mild degree and increases later. This is certainly true when the stimulus in relation to individual threshold is not of maximal intensity, and when other stimuli simultaneously evoke other types of affective response. In these circumstances, as I have argued elsewhere, fear may be completely or partially inhibited, to appear later in its full force when the stimuli responsible for its inhibition are no longer effective (Symonds 1943). When however the stimulus is of maximal intensity heedless flight is undoubtedly associated with intense fear. Immediate fear also results when the situation is such that there is nothing to arouse other types of affective response, when for example the individual is alone, without call of duty to others, and with no stimulus to manipulative activity. Other factors may also be taken into account, without the necessity of supposing emotional conflict. As I have already stated, the idea of danger either in reflection or anticipation may be a more potent stimulus to evoke fear than the actual presence of danger. The time factor here is important. When danger is sudden and transient only a part of the danger, sometimes only a small part, can be appreciated at the moment. Reflection gives time for fuller perception, with consequent increase of the stimulus. The same is true of anticipation. If there is time to study the picture of approaching danger in detail the total fear stimulus is greater than when it is seen momentarily and in part.

A second objection related to the first is that the state of morbid fear which is characteristic of anxiety neurosis only results from normal fear when there exists the possibility of conflict between fear and other emotions. But while it is true that in most situations in which fear is aroused the possibility of such a conflict does exist, there are striking exceptions. The example of panic flight has already been mentioned. This is a state often observed under conditions of war in which the sufferer is overwhelmed by fear to the exclusion of any other emotion as far as can be judged by his behaviour and subsequently from his own account of his feelings. The affective disturbance may persist long after his efforts have removed him far from danger. It may indeed persist for several weeks or months under conditions in which there is no longer any adequate cause for fear. It has been argued that such persistence of a morbid fear state following flight is due to conflict in so far as the wish to have behaved bravely has been frustrated by the wish to escape; but there are instances in which it is difficult to accept this explanation, the situation having been one in which no man could have been expected by himself or others to take any course other than flight. The state of morbid fear which develops following reflection upon a terrifying experience furnishes another example of a situation in which the materials for conflict may be absent. The sufferer may have behaved in a dangerous situation in such a way that he has no cause for self-reproach, and that situation may have been one which he will not have to encounter again, yet the state of fear persists.

The psychiatrist who assumes that the anxiety neurosis must invariably be due to emotional conflict will claim that its absence in cases such as those we have taken is only apparent, and will find for the patient's behaviour or his statements as interpretation which supports this assumption; but herein as we have observed may lie the weakness of his method and his claim. It is somewhat remarkable that for another type of affective disorder—depression—many psychiatrists are ready to admit the possibility of development of the morbid from the natural state as the result of excessive stimulation added to predisposition, but are unwilling to accept this possibility in the case of fear. Such a morbid state of depression they classify as endogenous, meaning by this that the catastrophe which has initiated the depressive state has acted as a spark to some inner store of tinder. If this is admitted for one type of affective disorder why should it not be admitted for another? An answer is it seems to be found in the definition of anxiety neurosis in terms of a set psychopathology.

There is possibly however a further explanation of the unreadiness of many psychiatrists to accept as simple an explanation of certain cases of anxiety neurosis as they are ready to admit in depression. In civil life conditions which will evoke intense depression are common: conditions which will evoke intense fear are rare. The development of a depressive state as the result of over-stimulation of the depressive affect occurs so often that it has been well recognised. Over-stimulation of the fear mechanism being uncommon has not been so well appreciated, though as the result of motor or flying accidents, shipwreck or earthquake examples do occur. The conditions of war are of course entirely different and it is noteworthy that psychiatrists with first-hand experience of war material have often expressed themselves in terms which admit the direct development of fear into anxiety neurosis. Dillon (1940), for example, states that 70 % of the cases of war neurosis he observed in the field represented—

"A direct anxiety or fear state characterised by generalised shaking, nervousness, jumpiness, and sometimes dizziness

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and headache. . . . This was the commonest form of 'Shell-shock' the symptoms of which constitute the basic features of all forms of the neuroses of war."

THE RÔLE OF CONFLICT

There is then some warrant for the belief that an anxiety neurosis may develop as a direct result of over-stimulation of the fear mechanism, that this is a common occurrence in war, rare in civil life; and that emotional conflict is not essential for the causation of an anxiety neurosis whether in civil life or war any more than it is essential for the causation of other kinds of affective disorder, for example, depression. These views are by no means incompatible with the supposition that emotional conflict may be an important or common cause of neurosis, either alone or as a factor complicating other causes.

We are all aware from introspective experience that conflict between opposing emotions has an unpleasant affective quality of its own. The quality is difficult to describe. It is a feeling of tension, uneasiness or insecurity which is distinct from other affective states though it most nearly resembles fear. It is recognised as a natural part of the reaction to a situation or idea which evokes opposing emotions and though it is an unpleasant feeling it is up to a point beneficial in sharpening judgment. This variety of affect is generally called anxiety. It lasts normally as long as the emotional conflict exists. As a rule the conflict is resolved by some action or decision taken by the individual whereby one set of emotions is further excited and the other set inhibited. The affective state of anxiety then disappears. There are many normal situations however in which emotional conflict is continuous over long periods and anxiety in lesser or greater degree also continues. We may speak therefore of chronic anxiety as well as acute anxiety, using the word anxiety here in a specific and restricted sense meaning the affective state engendered by emotional conflict; and may regard acute or chronic anxiety as normal so long as the circumstances when fully known appear to justify its existence. We must also be prepared to admit considerable individual variation in the readiness with which anxiety is aroused, its intensity and its persistence, these variations depending as in the case of other types of affective response both on heredity and experience. If the emotional conflict is sufficiently intense or prolonged, or if individual sensitiveness in respect of anxiety is greater than the average, and especially if both factors operate together, a morbid state of anxiety may develop which as in the case of other affective disorder once it gets beyond a certain point will persist, despite the absence of adequate cause. That such morbid states occur is well recognised in clinical psychiatry, and they are at present generally included under the heading of anxiety states. They have been described also as states of agitation or tension. It is as reasonable to suppose that intense though normal anxiety of the kind that arises from emotional conflict may give rise to morbid anxiety as that intense sorrow may give rise to morbid depression, or intense fear to a morbid state of fear.

CONFLICT NEUROSIS AND FEAR NEUROSIS

We have now reached a point in the discussion at which it is evident that we must distinguish in name as we have already distinguished in quality between a neurosis of conflict and a neurosis of fear. Hitherto we have followed custom in including both under the title of anxiety neurosis. Our argument for subdivision is, as we have already indicated, that the affective state associated with emotional conflict has qualities of its own as distinct from fear. The affect of conflict and the affect of fear are separable and corresponding with these two affects we may recognise two types of affective disorder, a conflict neurosis and a fear neurosis. The latter we have already considered as a typical affective disorder which may result from a variety of causes—inherited, physical and psychical. The conflict neurosis may be regarded in the same light. Among the patients customarily regarded as suffering from an anxiety neurosis, there are many whose major complaint is neither of fear nor depression, but of uncertainty, indecision, tension and restlessness, without adequate cause. In its most severe form this kind of affective disorder may be classified as psychotic and has been described as depression with tension (Muncie 1934). A conflict or tension state of this kind is most apt to develop in persons predisposed by heredity either to this or some other form of affective disorder: it may be precipitated by physical or psychical causes, or by a combination of both. When psychical causes are operative they are usually to be found in the form of intense or long-continued emotional conflict. The sufferer from a conflict neurosis like the sufferer from a fear neurosis is in consequence of his illness more easily disturbed by appropriate stimuli which are in this case such as simultaneously excite opposing emotions.

Of the two neuroses into which we have thus subdivided the anxiety neurosis the conflict neurosis is by far the commoner in civil life because occasions for emotional conflict are common and occasions of intense or prolonged fear are rare. Moreover one of the commonest emotional conflicts under conditions of peace is that between sexual and other emotions. Hence when psychical factors are a cause of conflict neurosis frustrated sexual desire is quite commonly found in the background. Herein probably lies the foundation of Freud's original conception of the anxiety neurosis as resulting from frustration of the libido. Under conditions of war not only is the fear neurosis much commoner than in peace, but the conflict neurosis, which is equally common, is usually derived from a conflict between fear and other emotions, instead of sex and other emotions.

We have so far considered the fear neurosis or the conflict neurosis as if each existed in a pure state, uncomplicated by the admixture of any other type of affective disorder. It is however a commonplace of clinical psychiatry that most affective disorders are mixed states. Under conditions of war there is especial opportunity for admixture of the affects of fear and conflict and out of this may arise various combinations. Normal fear versus other emotions may lead to a conflict neurosis in which, so long as the dangerous situation persists, the affect of fear is also present. A fear neurosis so long as other and opposite emotions are present to contend with it will be attended by the affect of conflict, or fear neurosis and conflict neurosis may coexist, both affective states existing or persisting in circumstances which do not justify their existence. Such distinctions may appear somewhat academic, for in practice it is often extremely difficult in the analysis of a mixed state of fear and conflict to decide whether one or the other or both are morbid as opposed to natural. I believe, however, that the distinction which I have supposed to exist between the affective states of fear and conflict deserves emphasis for it provides an explanation of a divergence of opinion as to the nature and causation of the anxiety neuroses of war which has been responsible for a good deal of confusion. For this reason, if for no other, fear neurosis and conflict neurosis might well be employed to supplant the term anxiety neurosis, which like other psychiatric labels in the past has acquired so many different connotations that it has become a hindrance rather than a help to clear thinking.

DEVELOPMENT OF WAR NEUROSIS

Making use of the distinction and the terms which have been suggested, I shall now trace in outline the development and symptoms of the common types of war neurosis. It is necessary in the first place to reassert that fear is a state which is natural, especially in such circumstances of extreme, continued or repeated danger as exist in war. The ease with which fear is aroused however, and its intensity and duration, will depend upon factors other than the intensity or duration of the stimulus. These factors comprise the innate sensitiveness of the individual and the sensitiveness or insensitiveness acquired as the result of conditioning and experience. Such sensitiveness whether innate or acquired may be specific for certain kinds of danger. The affective state of conflict when fear exists is equally natural under most circumstances, for danger in war as a rule excites affects other than fear—rage, sense of duty to others, regard for one's own reputation. If these inhibit fear—i.e., prevent the appearance of fear—or if fear inhibits the opposing set of affective stimuli, there is no conflict; but if both

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fear and opposing affects are aroused, a state of conflict must exist.

Upon these assumptions let us base an imaginary sketch of the mental state of a healthy minded person under stress of war. He first experiences fear at a stage in his military career before he is ever exposed to danger, fear lest he may be afraid and be found wanting in comparison with his comrades under an ordeal which is generally considered to be the crucial test of manhood. When confronted with the actual ordeal he experiences another kind of fear which is met by his desire to play his part well and support his comrades. Therein lies conflict. With repeated exposure to danger he becomes conditioned or seasoned by experience so that he acquires some degree of fearlessness. Stimuli which at first aroused fear are now inhibited, and conflict is less. With greater experience there is an increasing chance that intense or repeated excitation will overcome inhibition, or that fatigue, illness or injury may impair the inhibitory state. Fear and conflict therefore return and tend to increase if the experience of danger is continuous. With removal from danger the affective state returns to normal, though there may be an initial phase of increased fear owing to the removal of inhibition. When the time comes for facing danger again there is anticipatory fear based this time upon past experience of the affective distress of immediate fear and conflict. This fluctuating state of fear and conflict may continue indefinitely, with relief from the unpleasant affective disturbance when there is removal from danger. If this be so it may be said that fear and conflict are present only when there is adequate cause.

The development of a fear neurosis may be outlined thus. As a result of over-stimulation—to which individual sensitiveness as well as strength or duration of external stimulus may contribute—a state of fear is generated which persists even when the sufferer is removed from danger, and is further excited by stimuli which would previously not have aroused fear at all. His mind is haunted by fear when he is in circumstances of peace and quietness: he is frightened of traffic or of sudden noises. Whether there is conflict, or if there is, how much, will depend upon the morale of the individual—that is upon his ideals of duty and self-respect. In some persons there is no conflict—fear is naked and unashamed. This is the uncomplicated fear neurosis, but except as the immediate result of some intense and overwhelming danger it is uncommon. As a rule the sufferer from a fear neurosis is inclined to be ashamed of his fears and to combat them, so that added to the state of fear is that of conflict. If individual morale is high the state of conflict develops to a pitch at which overstimulation results in a continued state of tension and unrest so that though the sufferer is assured by his fellows and by the doctor that there is no justification for his self-criticism and accepts these assurances with his reason the feeling of conflict persists. This combination of fear and conflict neurosis is one of the commonest types encountered among men of good morale.

In other cases the repeated arousal of conflict by intermittent fear may lead to a continuous state of that affective state of tension, that feeling of being keyed up to fight against oneself, which is characteristic of conflict, even when fear is absent. Though he is removed from danger and there is neither cause for, nor feeling of, fear the sense of conflict remains and continues. This is the uncomplicated conflict neurosis which again is uncommon by comparison with mixed forms. The admixture of fear and conflict as component affects of the anxiety neurosis of course does not exclude others such as depression. In practice the affective neurosis is nearly always a mixed state.

CRITERIA OF WAR NEUROSIS

We have so far made no further attempt to define the boundary which is presumed to exist between anxiety neurosis and health—that is to say, between affective disorder and normal affect—than the statement that an affective state which appears to be unjustified by the circumstances in which it is present is to be considered morbid, and therefore evidence of neurosis. We have qualified this statement with the remark that these circumstances must be fully known to the observer before he is able to make the distinction. The qualification is obviously important; for the causes of what may eventually be considered a natural degree or persistence of affective disturbance are often not superficially apparent. The final criterion however is that which relates the affective disturbance observed to what might be expected of the "average" person in similar circumstances. This dividing line is relative and subject to variation. For example, if in peace-time a civilian passenger was involved in an air crash in which he himself was injured and a friend was killed, a persistent fear of flying might be judged normal; but under conditions of war, there is sustained excitation of other affects which tend in the normal person to inhibit fear, so that in a member of aircrew who had had such an experience as we have described persistent fear might be regarded as abnormal. But if the squadron morale happened at the time to be relatively low the airman would be more vulnerable and persistent fear might be regarded as normal. It appears then that the dividing line between neurosis and normal affect is arbitrary depending upon the current estimate of how intense or persistent affective disturbance should be in the normal person under given circumstances.

A further question to be discussed is the importance, as a criterion of neurosis, of unawareness in the individual of the nature, or causes, of his affective disturbance. We have noted that the psychopathological theory of anxiety neurosis lays considerable stress on the origin of the affective disturbance in the unconscious. According to this theory it is chiefly because certain feelings and thoughts are repressed and kept out of consciousness that they are potent for harm. When they are brought into consciousness most of their power is lost. In the anxiety neurosis of war the feeling of fear and the desire for escape together with the memories and thoughts associated with this feeling and desire constitute a constellation or complex which, existing in the unconscious, is at war with the rest of the personality. It is this secret battle within the mind which is the essential cause of the neurosis. Psychiatrists of another school are more elastic in their views.

Thus Mapother and Lewis (1937) write: "Consciousness . . . is only an attribute of mental happenings, not their essence or criterion; mental life goes on with various degrees of consciousness attaching to it. There is no sharp division between conscious and unconscious mental life: no region called 'the unconscious' with its own rules and contents. Many of the psychological happenings most significant for psychiatry go on without clear consciousness of them, but in appropriate conditions they may be accompanied by much more, or by full consciousness."

If we take the latter point of view we shall regard the question whether the individual is aware of the nature or causes of his affective disorder as of little value as a criterion of its morbidity, since unawareness of much that is happening in the mind is a natural feature of mental life. A man may be sad, frightened or happy without being fully aware of his state of feeling or the events which have led up to it, and this may be considered normal. This does not mean however that self-deception and repression may not at times play an important part in the symptomatology of affective disorder.

An affect must be felt before it can exist. There can therefore be no such thing as unconscious affect, but a man may nevertheless be unaware of the nature of affect within himself. This is a commonplace in war when the admission of fear is so unwelcome that the very word is excluded from the vocabulary of the soldier, though he may allow himself to speak of "wind up," a term which also includes the uneasiness of conflict between fear and other emotions. Such unawareness cannot, per se, be regarded as morbid, nor when fear or conflict have developed into neurosis can unawareness of nature or cause be regarded as an essential feature of the neurosis. Individuals may be more or less aware of the true character of affective disorder as of normal affect, and the degree of awareness may depend upon many different factors including intelligence, capacity for introspection and previous experience, as well as reluctance to face unpleasant facts. Of two men suffering the distress of a persistent and morbid fear with the bodily disturbances usually associated with it, one may com-

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plain that he fells ill, has palpitation and indigestion and does not know what is wrong with him: the other may come to the doctor complaining that he is in a constant state of fear. Both may be making an equal effort to persist in the face of danger despite their neurosis, with resultant symptoms of conflict. One will add to his complaint of feeling ill, that of being restless, tense and irritable, again submitting these sensations as part of an illness which he does not understand, the other will admit that the effort to control his omnipresent fear has resulted in a state of tension which is unbearable. Both men are suffering from neurosis. The one is aware of its nature and causes, the other is not. The presence or absence of awareness nevertheless has an important bearing on the form and further development of the neurosis. The man who lacks awareness is likely by a further process of self-deception to find in symptoms which are presented to himself and others as those of bodily illness, a means of escape from the situation which has in fact been the cause of his neurosis, and is now aggravating it. For the man with awareness there is no such means of escape. Consequently neurosis is aggravated by more prolonged stimulation of the affective mechanisms concerned, reaches a more severe degree and is less amenable to treatment. Awareness therefore is for the individual at the same time an advantage and a disadvantage. It protects him from hysteria, but renders him liable to more protracted and more severe states of fear and conflict.

SUMMARY

Anxiety neurosis in flying personnel and in troops in the battle zone generally arises from fear. There are two different views of the process by which the neurosis develops. One supposes that there is a conflict between fear and other emotions, of which the sufferer is generally unconscious, and that the affective disturbance results from frustrated instinctive desire. Another view is that over-stimulation of the fear mechanism can result in a persistent and morbid state of fear. The arguments for and against each of these hypotheses are reviewed.

It is suggested that the anxiety neurosis of war includes two kinds of affective disorder. The dominant affect in one is fear and in the other a state of tension associated with emotional conflict. Either affective disorder may occur alone though generally they occur together.

The distinction between anxiety neurosis and normal affective reaction is discussed in relation to flying and combatant duties, and it is concluded that this distinction is relative and subject to variation.

The importance as a criterion of anxiety neurosis of unawareness in the individual of the nature and causes of the affective disorder from which he suffers is discussed and it is concluded that lack of awareness is not an essential feature of the neurosis, though it may in certain respects influence its pattern and prognosis.

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CLINICAL STUDY OF AN OUTBREAK OF INFLUENZA B

DURING THE WINTER, 1942–43

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BETWEEN November, 1942, and the end of February, 1943, an epidemic of influenza B was investigated in certain military units. This paper records the clinical data (see also Stuart-Harris, Glover and Mills 1943).

In one of the units notes were made on 42 cases, 31 of which were studied by one of us (J. M. S.), 7 by Lieut. A. B. Kinnier Wilson, RAMC, and 4 by Major T. M. A. Lewis, RAMC. All the patients had been admitted to camp reception stations with fever and acute respiratory infections, although not all were thought to be cases typical of influenza. By courtesy of Major R. S. Muckenfuss, USAMC, records of 25 patients admitted to the 1st Medical General Laboratory of the US Army, and suffering from influenza-like illnesses, were also available.

Hirst serum tests were made on both acute and convalescent sera of all these patients and according to the rise of antibody to influenza B they may be placed in three categories:—

1. *Significant rise of antibody* (*4-fold or greater*)
   24 from reception stations, 11 from American hospital } Influenza B.
2. *No rise of antibody*
   14 from reception stations, 12 from American hospital { 3 diagnosed clinically as atypical pneumonia. 23 influenza Y (undetermined ætiology).
3. *Doubtful rise of antibody* (2–3 *fold*)
   4 from reception stations, 2 from American hospital } Unclassified.

Sera from all cases in categories 2 and 3, and from 6 cases in category 1 were also tested against virus A, but no significant rise in antibodies was detected. The term influenza Y (Rickard et al. 1941) was given as a matter of convenience to the group of cases of clinical influenza whose ætiology remained undetermined by the serological methods employed.

The symptoms of the camp reception station cases were recorded in sufficient detail for comparison of influenza B and Y groups with each other and with 60 collected cases of influenza A (Stuart-Harris 1941). The table indicates that the three groups differed little clinically. This agrees with the opinions of the clinical observers, who could not differentiate between them.

SYMPTOMS AND SIGNS COMPARED

—	1942–43		1937–41
	Influenza B (24 cases)	Influenza Y (12 cases)	Influenza A (60 cases)
ONSET (%)			
Sudden	78	100	75
Premonitory symptoms	39	9	18
SYMPTOMS (%)			
(*a*) *Constitutional*—			
Sweating	91	58	17
Headache	83	100	85
Shivering	82	83	80
Malaise	80	100	87
Anorexia	79	91	71
Muscular pains	75	66	60
Giddiness	58	55	32
Nausea or vomiting	29	33	17
Photophobia	14	8	20
Insomnia	12	0	38
Fainting	7	0	5
(*b*) *Respiratory*—			
Cough	92	58	88
Coryza or nasal obstruction	66	58	80
Sore throat	42	50	48
Substernal chest pain	33	17	11
Sputum	24	54	31
Hoarse voice	12	8	10
Other chest pain	9	19	0
Epistaxis	0	0	8
FEVER			
Average length	3 days	2·85 days	3 days
Secondary rise (diphasic curve)	46%	0%	21%
Average maximum temperature	100·8° F.	102·5° F.	101·2° F.
ABNORMAL SIGNS IN CHEST	18%	33%	35%

The records from the American hospital showed general agreement with the other cases studied as far as symptoms were concerned. An important difference was the inclusion of a number of afebrile patients (who were all negative serologically) so that the average duration of

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fever in the influenza Y group was only one day after admission to hospital, compared with two days for influenza B. The cases at the American hospital probably represented a truer sample of the current respiratory infections than did the febrile patients in the camp reception stations.

In addition to clinical data, X-ray findings were available in 20 cases, and leucocyte counts in all 25 cases in the American hospital.

The chest skiagrams of 8 of the patients with influenza B taken at various stages from the 2nd to the 7th day were normal; one other showed doubtfully significant increase in hilum shadows on the left side during the fever. In the influenza Y group skiagrams taken from the 2nd to the 11th day were normal in 8, and indicated pleuritis of the right base in one. One other patient at the American hospital with negative serological findings had lung changes suggestive of atypical pneumonia, and 2 in the camp reception station group were similarly diagnosed on clinical and radiological grounds.

The importance of the radiological findings in true influenza B was that atypical pneumonia had occurred sporadically among British troops in the area during the previous nine months, and the disease was also prevalent among American troops in an adjacent locality. Chest complications were singularly infrequent in cases from all areas during the period of influenza prevalence.

Leucocyte counts, on admission, varied from 3400 to 10,000 per c.mm. in the cases of influenza B, and from 3300 to 12,000 in influenza Y. Differential leucocyte counts were also insufficiently deviated for diagnostic purposes.

DISCUSSION

Nigg et al. (1942) describe an influenza-like epidemic in a mental hospital during May, 1939, which was subsequently found to be due to influenza virus B. They compare its clinical features with those of influenza A occurring earlier in the same year and note that influenza B differed from A in that coryza was commoner and generalised aching less common, while the average temperature of the B group tended to be a little lower. White-cell counts were about the same for both. The unreliability of mental patients as regards symptoms made it difficult to determine the significance of the clinical differences, but in any case they were not clear enough to afford means of separation.

In our series influenza B differed little from influenza A either in general aching or incidence of coryza, although the average maximum temperature was slightly lower. We too concluded that clinically the two groups were indistinguishable.

Taylor et al. (1942) compare 23 cases of influenza B seen in the Argentine during 1941 with a group of influenza A cases in the previous year. They believed influenza A to be somewhat more severe and more uniform in symptomatology than B. Generalised symptoms were more persistent, and sweating, body pains, expectoration and inflammation of the eyes and throat were noted more often in the A group. We were unable to demonstrate such a difference.

SUMMARY

A group of 24 cases of influenza B (proved by serological tests) is compared with a group of 12 clinically similar cases occurring in the same outbreak but showing no rise in antibody to either A or B virus (classified as influenza Y), and also with a collected series of 60 cases of influenza A. Little difference is apparent between the three groups.

The clinical findings were in general agreement with those in cases admitted to an American army hospital, whose chest skiagrams, leucocyte counts and differential counts were not diagnostically significant.

Influenza A and influenza B appear to be clinically indistinguishable in the individual patient.

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INFLUENZA IN BRITAIN, 1942–43

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THE changing character of recent influenza epidemics was discussed in a previous paper (Andrewes et al. 1941). As a four-year cycle had prevailed in England since 1929, it was anticipated that 1941 might be a peak period; nevertheless, the outbreaks that winter were relatively mild. Laboratory studies indicated that much of the sporadic clinical influenza during January, 1941, was due to influenza A virus, but ferrets were less readily infected than in earlier outbreaks and the viruses recovered were not easily adapted to mice. It was confirmed that testing of acute and convalescent human sera for neutralising antibodies is a more delicate index of infection than ferret inoculation.

During the winter and spring of 1941–42 and 1942–43 a study of influenza has been continued.

PERIOD 1941–42

During this season there were neither localised nor spreading epidemics, but fairly numerous sporadic cases, diagnosed clinically as influenza, were encountered.

The tests made by one of us (C. H. S.-H.) and by the late Miss Dora Lush, consisted in attempts to infect chick embryos with filtered garglings and in estimations of the serum inhibition titres to influenza virus agglutinin for the red cells of the fowl (Hirst 1942), both during the febrile stage of the disease and 7 to 10 days later, during convalescence (Stuart-Harris 1943). The Hirst tests were carried out with small batches of virus fluid prepared from time to time as embryos were available, and an unavoidable variation was thus introduced by the employment of different virus fluids. The importance of comparing the inhibitory power of the two sera from one individual against the same virus fluid and the same fowl red cells on the same day has been emphasised (Stuart-Harris 1943).

Serum tests made on 52 sporadic cases of influenza and also of atypical pneumonia in the winter of 1941–42 yielded entirely negative results; a few garglings received from military units were tested on ferrets also with negative results. It was thus confirmed that no influenza virus infection of a known type was current during this season.

PERIOD 1942–43

Epidemiology.—During the winter 1942–43 an investigation of acute respiratory infections was carried out in two divisions in which cases were officially notified (Stansfeld et al. 1943). In division B the notifications were subdivided into febrile and afebrile, but in division A they included all cases of colds, sore throats, pharyngitis, tonsillitis, influenza, bronchitis and pneumonia, whether febrile or not. The incidence of respiratory infection was low in both divisions, even during January when a sharp rise took place and for a fortnight there was a mild outbreak in most of the units. Some regiments, however, had merely sporadic cases of influenza such as are seen regularly at this time of year. The notifications in division B during January indicated a much greater proportional increase in febrile than in afebrile cases.

Clinical and laboratory investigations.—During the entire period in division A, and from January to March in division B, tests were made on garglings and sera collected from cases of upper respiratory tract infections. A few specimens were also received from civil or military patients in other areas, including patients admitted to the 1st Medical General Laboratory of the US Army. Tests were made in all upon 15 individuals most of whom suffered from attacks of clinical influenza of varying severity. A few were selected for study for special reasons, such as clinical resemblance to atypical pneumonia (2 patients in November) or lack of febrile reaction (4 patients in January), and so far as possible febrile patients from division A were studied irrespective of symptoms. Sera from 4 cases diagnosed as "gastric influenza" were examined in April.

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In contrast to the previous season when no significant rise in antibody was detected by the Hirst test, differences in titre between acute and convalescent sera were noted. From the middle of December, 1942, until the middle of February, 1943, a proportion of the cases upon which serum tests were made showed an increase in antibody to influenza virus B, but not to influenza A.

The entire series of tests in 1942–43 were made with reconstituted dried allantoic fluid kindly made available by Dr. G. K. Hirst of the International Health Division of the Rockefeller Foundation, New York. Early in 1943 Hirst's new technique (1942) was adopted using 0·5 c.cm. quantities of serum and virus and red-cell standards from 0·25% to 0·87%. The period of sedimentation was increased from 60 to 75 minutes. As many different batches of fowl red cells as possible were employed during the tests in order to minimise in the final results, the influence of individual fowl cells, which had been found to have an effect on the actual inhibitory power of a serum against virus B but not against virus A. The simultaneous test of the two sera from each patient with the same reagents also reduced variation in the results from technical causes.

In each test standard sera were used—namely, a hyperimmune rabbit serum for B tests and two pools of human sera (1941) for A tests. In 22 out of 25 tests of the B serum against the homologous virus the readings were between 1/128 and 1/256: the other 3 were 1/64, 1/96 and 1/320. The 14 tests of the human pool sera versus A ranged from 1/64 to 1/160.

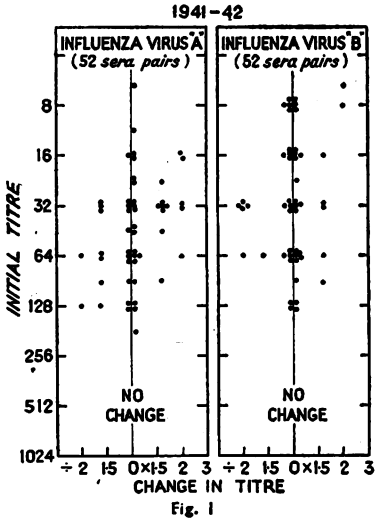

Fig. 1

Fig. 1 shows the results of the Hirst test on 52 pairs of sera from 1941–42, difference of titre of the two members of each pair being plotted against the titre of the first serum collected during the fever. Most of the pairs of sera showed no change in titre with either virus A or B; a few showed a decrease, and a few an increase in titre not exceeding 2-fold, against either virus. Hirst has stated that a 4-fold increase indicates influenza virus infection; so the results with these sera were, by his standards, negative.

Fig. 2 shows the results, similarly plotted, of tests with virus B on 114 sera from 1942–43, 78 of which were also tested against virus A. Of these 114, 52 showed either no change, a decrease in titre, or an increase not exceeding 1½-fold; 12 showed a 2-fold or 3-fold increase, and 50 showed an increase 4-fold or greater. The sera of all 52 in the first category, of 11 in the second category, and 15 which exhibited 4-fold or greater increases to virus B, were tested against virus A. Only 2 pairs of sera exhibited differences in titre with virus A in excess of three times—namely, 4-fold and 5-fold increases; the majority showed no change, and the sera which were placed in various categories by the tests against virus B showed no such differences with virus A. These results were interpreted as indicating infection with influenza virus B in 50 patients.

Fig. 2 also shows that the rise of B antibodies in individual patients was correlated with the initial titre of the serum, so that patients with low initial levels of antibody (8–32) more often showed increases in antibody than did those with high initial levels (128–512).

For 16 pairs of sera the results of the Hirst test were checked by neutralisation tests in mice; the sera included specimens in which the rise was considerable and others in which it was small. The results were plotted graphically as by Hirst (1942). Correlation was good, though not quite so close as in Hirst's results with influenza A virus; this is doubtless largely accounted for by the variable introduced into the

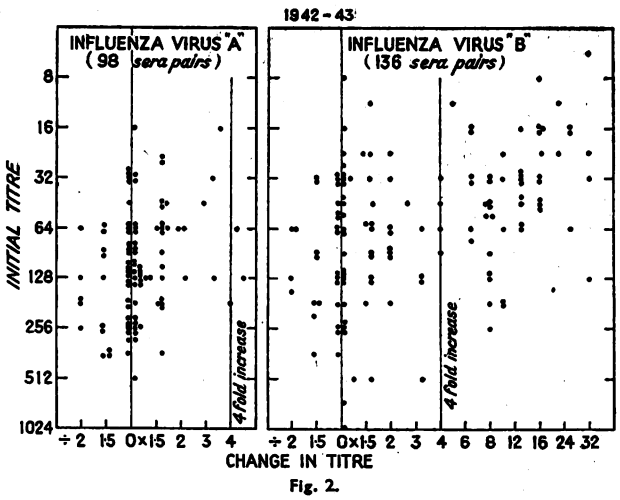

Fig. 2.

tests with B virus by the unavoidable use of cells from different fowls.

Towards the end of the normal influenza season and after it, there were a number of small outbreaks apparently due to influenza A. Two of three sporadic cases of influenza arising towards the end of March in a single unit of division B showed increases of antibody to influenza A but not to B. This unit was disbanded five days later, so further observations were impossible From a localised outbreak in East Anglia in March, 1943, ten sera were examined—2 pairs (acute and convalescent) and 6 single (convalescent) specimens. The paired sera showed in one case a definite (×8), in the other a doubtfully significant rise of titre against A, but none against B: one of the single specimens showed so high an anti-A titre (1/512) as to suggest a recent A infection. From an outbreak on an RAF station, also in East Anglia, in May, 1943, 7 pairs of sera were obtained; none showed any rise against B but 4 showed a rise against virus A (×6 to ×16). Finally pairs of sera from a local outbreak in Scotland in June, 1943, showed in 4 instances a significant rise and in 2 a trivial (×2 to ×3) rise against virus A; again there was no evidence of B infection.

Attempts were made to recover, by means of egg inoculations, strains of influenza virus from the garglings of patients who did, or did not, show increases in B antibody as a result of their infection. Garglings were not available from the cases of influenza A, but those from 21 cases were tested, of which 11 were from patients diagnosed as influenza B on serological grounds. The garglings were filtered and inoculated amniotically into 12-day chick embryos, and passage from chick to chick was carried out 1–14 (usually 3) times. No virus was recovered by this procedure; the extra-embryonic fluids of the inoculated eggs never acquired the power to agglutinate fowl red cells, nor did they (11 samples) produce lesions in mouse lungs, even on passage, or (6 samples) infect ferrets.

Ferrets.—Garglings from 26 patients were inoculated into ferrets between January and April, 1943. Of these, 7 came from the military units mentioned above, 2 from the Eastern counties and the rest from the London area: if circumstances did not permit immediate inoculation they were stored in CO_2 alcohol at −76° C. for a few days.

The garglings were administered intranasally to ferrets in the usual manner under ether anæthesia. The results were at first sight completely negative since no recognisable clinical symptoms with typical fever were detected. As the number of ferrets was insufficient to permit "blind" serial passages as carried out in previous years, we decided to apply the Hirst test to the sera of "convalescent" ferrets to determine whether antibodies against either A or B virus had developed.

The general plan was to inoculate two ferrets with the original material. One of the pair was killed at the 4th or 5th day and a centrifuged suspension of lung and turbinate in 10% serum broth was frozen in CO_2 alcohol. The second ferret was bled about 14 days after inoculation and the serum

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tested against both A and B viruses. Preinoculation bleedings were taken in some but not in all of the ferrets. The inhibitory action of normal ferret serum varies according to the particular sample or pool of fowl red cells which is being used. Preliminary tests have indicated that the inhibitory titre of normal serum usually ranged from 1/32 to 1/128 but that occasionally readings as high as 1/142 to 1/256 are encountered. Antibodies against A or B virus were judged to have developed if the titres of the serum 14 days after inoculation was above the upper level of the normal range. If the serum of the second ferret showed a high antibody level, the stored material from the first ferret was passed to two more animals.

Of the 27 samples thus tested, 3 provoked a rise in temperature to over 104° C in one of the original pair, but it is doubtful if the reactions were specific for influenza since passage of suitable material failed to induce a febrile response. Recognisable symptoms were absent in all ferrets inoculated with original garglings and in those in the passage series. No gross changes were found post mortem: sometimes the turbinates were slightly congested and moister than normal, but no increase in the turbinate reaction was observed on passage to other ferrets.

In 19 instances the sample of convalescent serum from the ferret inoculated with the original material failed to show any appreciable increase in A or B antibody, but in the remaining 8 there was a 4–16-fold increase in antibody against B virus, (2, ×4; 1, ×6; 2, ×8; 1, ×12; 2, ×16). In passage ferrets, a significant rise in antibody was detected in animals after 1, 1, 2, 2, 2, 3, 3 and 6 passages respectively. The specificity of the antibody in the ferret sera was confirmed in 5 instances by neutralisation tests in mice, in which suitable serial dilutions of ferret serum were mixed with mouse-lung filtrate (B. virus, Lee strain).

We gained the impression from these studies that a virus serologically indistinguishable from B was being transmitted through the ferret. It was insufficiently active to provoke a febrile response or to establish clinical symptoms, but was capable of stimulating antibody production. Dr. Himmelweit (1943) was more successful than we were; he passed a strain through ferrets, and after 15 passages induced it to infect chick embryos. He kindly sent us some of his material which we found to be influenza B by the Hirst test.

The two samples from the Eastern Counties did not infect ferrets, and tests of their sera were negative although an appreciable rise in A antibody in the convalescent sera from these patients was detected by the Hirst test.

The table summarises the results of the serological tests in 1942–43, showing the proportion which gave positive results amongst (*a*) the human sera, (*b*) the ferret sera. It will be seen that comparison between sera

REACTION TO HIRST TEST (B VIRUS)

Garglings tested	SERA			
	Human + Ferret +	Human − Ferret −	Human + Ferret −	Human − Ferret +
21	6	7	8	0

from human cases and sera from ferrets inoculated with the corresponding garglings was possible in 21 instances. In 7, human and ferret sera were negative; in 6, both were positive; in the remaining 8, the human sera were positive, the ferret sample negative.

Suspensions of ferret turbinates and lungs from the most promising cases were inoculated intranasally into mice without result. In 2 instances the tissues from ferrets inoculated with garglings were used, while the third-pass material was used in one case and the fifth-pass in another. Two of these strains were passed six times, one three times, and one twice, through mice in series, but no evidence of B infection was detected although in one instance the survivors from a group inoculated primarily with ferret tissue were subsequently proved to be immune to B virus.

In general the results, though disappointing, confirm the serological results on the human patients, and they emphasise the great difficulty in establishing strains of influenza B in animals. The lack of infectivity of filtered garglings for the chick embryo is not altogether surprising in view of the low percentage of positive results obtained in this country in 1941 with garglings from cases of influenza A.

DISCUSSION

Recent serological tests (Lush, Stuart-Harris and Andrewes 1941) showed that a considerable proportion of cases of influenza towards the end of the 1939 season were due to B virus. This was the first record of the existence of this strain in the British Isles. In 1940–41 there were mild epidemics, some of which were due to A virus (Andrewes et al. 1941), but no evidence of B virus was found. During the early months of 1942 there were no widespread epidemics, no viruses pathogenic for ferrets were isolated, and no serological evidence of antibody rises against viruses A or B was obtained. Towards the end of the year, however, and again in January and February, 1943, a mild increase of acute respiratory infections, with a small peak in January, was associated with serological evidence of influenza virus B infection. The illnesses were clinically typical of influenza, but some other respiratory infection which did not evoke serological changes for known influenza viruses was prevalent at the same time; many of these cases were afebrile, but some were febrile and could not be differentiated clinically from influenza B. Subsequently (March to June) the type changed and several minor outbreaks of influenza A infection developed in different parts of the country. They remained localised, however, and although occurring in widely separate areas, showed no tendency at this time to assume epidemic proportions.

There is some similarity in the epidemiology of influenza in this country in recent years and in the Argentine during 1940–42.

Taylor, Parodi, Fernandez and Chialvo (1942) report that in 1940–41, 22 human sera out of 26 showed neutralising antibodies to A virus, 1 to B and 1 to both A and B. After the epidemic had passed, 3 persons showed a rise to B only, but probably a mild B attack was in progress since later in the year a number of sera showed high antibodies to both A and B.

In 1941–42 both influenza virus B and cases of undetermined ætiology were encountered. They were generally mild and gave rise to few complications. No evidence of influenza A virus infection was obtained. Taylor et al. remark on the relative ease with which strains of virus were isolated from throat washings taken during 1940 and transmitted to ferrets, in contrast with the general failure of similar efforts with 1941 material.

The Hirst technique is exceedingly valuable in detecting virus B outbreaks, provided the factors causing variation in the inhibition titres of any particular serum are fully recognised and suitable precautions are taken against false readings (Stuart-Harris 1943). Like Taylor et al., we have found it useful to instil garglings into ferrets and examine the serum by the Hirst technique for antibody rise. In a proportion of cases in which the convalescent serum of the human patient showed a significant rise against virus B, the ferret serum was also positive. Serial passages through ferrets may also induce a rise in antibody although no overt symptoms of infection can be recognised. So far we have not isolated a B strain from garglings, either by ferret or mouse passage experiments or by the inoculation of the amniotic or allantoic cavities of developing eggs. Himmelweit (1943), however, has isolated from a fatal case of influenzal pneumonia a strain which closely resembles, though it is not identical with, the B strain (Lee), and he succeeded in infecting ferrets and chick embryos.

Taylor shows that in the Argentine a relatively widespread epidemic of influenza A—explosive in character but disappearing quite rapidly—was associated with or followed by an influenza B outbreak. In the following year sporadic influenza with no peaking was apparently due to influenza B and to an unidentified agent. In this country the reverse appears to have happened: a mild epidemic caused by B virus in association with unknown agents was followed by outbreaks due to A virus. At the time of these observations (June, 1943) the question suggested itself, "Will the change in type result in a widespread epidemic?" At first there was

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no apparent increase in the distribution and severity of outbreaks, but since November, 1943, influenza has appeared in epidemic form and preliminary tests at the National Institute for Medical Research have shown that A virus is the predominant type.

SUMMARY

1. Early in 1942 examination of convalescent sera by the Hirst technique, and transmission of garglings to ferrets and developing eggs, failed to reveal any evidence that the mild influenza outbreaks then occurring were due to influenza viruses A or B.

2. A mild increase in the incidence of acute respiratory infections early in 1943 was associated with serological evidence of influenza B virus infection. Later in the season (March to June) small scattered outbreaks of A virus infection were encountered.

3. The value and the limitations of the Hirst test are discussed.

We extend our grateful thanks to numerous doctors, both Service and civilian, and especially to the 1st Medical General Laboratory, APO 519, US Army, for unfailing help in facilitating this investigation. We are especially indebted to Dr. C. H. Andrewes, FRS, for advice and assistance in preparing our report.

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INFLUENZA VIRUS B
ISOLATED FROM A FATAL CASE OF PNEUMONIA

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SINCE the first isolation of a virus from patients suffering from epidemic influenza by Smith, Andrewes and Laidlaw (1933) it has been shown that at least two distinct antigenic types of influenza virus exist. Francis (1940) and Magill (1940) discovered in America strains now known as influenza virus B. They have no immunological relation to the original strain or to others subsequently isolated and grouped together as influenza virus A.

Serological evidence of virus B infections in this country has been obtained by Lush, Stuart-Harris and Andrewes (1941) and by Stuart-Harris, Glover and Mills (1943). Attempts to isolate a virus from garglings of patients have, however, hitherto proved ineffective. Through the kindness of Prof. W. D. Newcomb, to whom I am also indebted for a description of the post-mortem findings, I have had access to a fatal case of influenza from which I recovered a virus closely related to the B strain (Lee) isolated by Francis.

CASE-HISTORY AND POST-MORTEM FINDINGS

The patient, a man aged 55, fell ill on Feb. 8, 1943, and thought he had influenza. Next day he was much worse, with precordial pain and pyrexia, and in the evening he had a hæmoptysis (about ½ pint). He became semi-conscious, and on Feb. 10 was admitted to St. Mary's Hospital, moribund. He died before being clinically examined The following were the findings at autopsy on Feb. 11 :—

Respiratory system.—Dark altered blood exuded from the nose. The larynx and trachea were rough and reddened; thin, grey, friable membrane in patches on cartilages gave a banded appearance to the inner surface. There was much frothy bloodstained fluid in the trachea and bronchi. Both pleural cavities also contained bloodstained fluid. The lungs were dark and heavy; there was no fibrin on the surface, and they showed bloodstained œdema with patchy peribronchial consolidation.

Microscopically it was found that all the surface epithelium of the trachea was shed; there was little fibrin on the surface and there were masses of staphylococci, but few leucocytes. The epithelium of the bronchi was also shed. The lungs showed patchy bronchopneumonia, necrosis near brochioles, much hæmorrhage, and many staphylococci.

Other findings.—Cloudy swelling of myocardium, liver and kidneys; early septic spleen.

The important points are: (1) the enormous number of staphylococci, giving a heavy growth of *Staph. aureus* on culture from the lung; (2) the destruction of epithelium in trachea and bronchi; and (3) necrosis, hæmorrhage and little active reaction in lungs.

ISOLATION OF VIRUS

Eighteen hours after the patient's death a bacteria-free filtrate of lung tissue was prepared for inoculation of a ferret and mice.

Preparation of filtrate.—The current method of obtaining virus filtrates involves clarification of a tissue suspension through paper and asbestos pulp (Elford 1938). A method developed during the past year makes it possible to dispense with this initial clarification with consequent saving of time and labour.

After the usual centrifugation of the tissue suspension at 3000 rev./min. for 30 minutes, the supernatant fluid is filtered through three superimposed 'Gradocol' membranes. The membranes, which were prepared in this department, had an average pore diameter (APD) of 1·5μ 1·05μ and 0·7μ; they were so arranged that the suspension had to pass first through the membrane with the largest APD and last through the one with the smallest APD. The membranes thus act in succession as traps for particles of decreasing size, and each membrane holds back particles which would tend to block the pores of the next one. The membrane of 0·7μ APD retains bacteria.

By this method the volume of filtrate per unit area of membrane is about half that obtained by the method involving preliminary clarification. On the other hand, it is found possible to use tissue concentrates (e.g., lung emulsions from mice infected with influenza virus) up to 20% compared with the 5% used in the current method. The yield of such filtrates is comparatively smaller, but their potency measured by the 50% end-point calculation method of Reed and Muench (1938) is two or three times that normally obtained.

This method was used for the preparation of a filtrate from a 20% suspension of lung tissue from the case described above.

Inoculation of ferrets.—The filtrate (1·0 c.cm.) was passed to a ferret in the usual way and a slight rise of temperature (103° F.) was observed after 88 hours.[1] The animal was listless, but no other signs were observed. On post-mortem examination nothing abnormal was seen.

A filtrate from a 10% suspension of the turbinates, prepared by the method outlined above, was passed to a second ferret four days after the initial inoculation. The temperature rose to 103·8° F. after 64 hours. A third ferret similarly inoculated from a filtrate of the turbinates of the second ferret produced a temperature of 103° F. after 64 hours and in this animal congestion of the turbinates and a slight livid discoloration of one lung lobe was seen. Subsequent passages were made to 21 ferrets in all, at intervals of three to four days, involving 19 regular passages. The 17th and 18th passages were done in duplicate; 1 ferret of each of these two passages was bled after a fortnight to obtain sera; all the others were killed on the third or fourth day. From the 4th ferret passage onwards, all showed congestion of the turbinates and more or less extensive livid areas on the lungs; all reached their maximum temperature 48 hours after inoculation. Ferrets 7, 8 and 21 showed temperatures between 104° F. and 105° F. Most of the animals were obviously ill, listless and eating little; 5 had wet noses and sneezed. In general these effects were similar to those observed by Francis in ferrets inoculated with influenza virus B.

1. The normal temperature of the ferret is about 102° F. Owing to non-specific temperature elevations often seen with these highly excitable animals, most workers do not consider readings below 104° F. as pathognomonic. As a routine, the temperatures of the ferrets in this department are taken daily for a fortnight, and only those which do not show a temperature above 102° F. during this period are selected for inoculations. This makes it possible to consider a rise to 103° F. as suggestive of a "take."

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Inoculation of chick embryos.—Attempts to infect chick embryos were made first from the filtrate prepared from the turbinates of the 12th ferret, since no embryos were available before this. Neither this filtrate nor one prepared from ferret 14 proved successful. From the 15th ferret, however, it was found possible to transfer the virus to chick embryos. The inoculation in every case was done by the amniotic route and the embryos incubated at 35° C. (Burnet 1941). The first pass to two embryos did not result in any obvious infection, but passes from these to two further embryos produced a positive result. The allantoic fluid of these embryos agglutinated chick cells (Hirst 1941). From this fluid a further 27 passes were made and there was a demonstrable increase in the infective titre of the allantoic fluid. This reached a maximum at the 15th passage, a dilution of 10^{-8} killing the embryo within 48 hours and a dilution of 10^{-9} showing that virus was present by a positive Hirst test. From the 6th passage onwards, inoculations were made into the allantoic cavity instead of the amnion. Discrete lesions were first observed on the considerably thickened chorio-allantoic membranes of the 10th passage embryos.

Inoculation of mice.—Many attempts were made to infect mice with the virus. Filtrates from the human lung and from the turbinates and from the lungs of 19 ferrets and allantoic fluid of 6 infected chick embryos were used. These inoculations did not produce lung lesions in any of the mice, nor were such lesions produced by further passages from these mice. Serial passes were made in different experiments through 5, 6, and 8 mice.

Serological investigations.—Sera obtained from 2 ferrets inoculated in parallel with the 17th and 18th passage ferrets were tested against the new virus strain, using allantoic fluid, and against egg-adapted influenza virus A (PR8) and influenza virus B (Lee) strains. Using Hirst's technique (1942), it was found that these sera inhibited to a high titre the agglutination of fowl erythrocytes by the new virus strain and by the virus B strain, whilst no effect was observed on the agglutinating power of the virus A strain. A PR8 ferret immune serum, on the other hand, tested against the new strain, proved ineffective. Lack of a virus B immune serum prevented a further test for a more detailed identification. The conclusion seemed justified, however, that the new virus strain, which may conveniently be called the "Paddington strain," was definitely not an A strain, but most probably related to the B type.

Dr. C. H. Andrewes and Miss K. Mills kindly confirmed the above findings and their serological investigations showed that this virus strain closely resembles the virus B strain (Lee). Samples of convalescent ferret sera and human sera obtained in 1943 showed slightly greater antibody rises against the Paddington strain than against the Lee strain of influenza B.

DISCUSSION

The difficulties experienced in recent years in isolating influenza virus B strains in this country are probably due to their low virulence. The fact that an influenza B strain has been isolated from a fatal case does not necessarily prove its special virulence. It is very likely that the rapid fatal issue was due to toxæmia resulting from the heavy infection with *Staph. aureus*, the patient having had probably very little resistance against this organism. The association of influenza virus with *Staph. aureus* in a rapidly fatal case of influenzal pneumonia recalls the observations of Andrewes, Smith and Stuart-Harris (1937) that "when *Staph. aureus* is a secondary invader, death is apt to occur more quickly."

Serologically, the new B strain closely resembles the B (Lee) strain. But its high virulence for chick embryos and its reluctance to infect mice are distinguishing features.

SUMMARY

The isolation of an influenza virus B strain from a fatal case of influenzal pneumonia is described. By a modified method of filtration through 'Gradocol' membranes a highly potent filtrate of lung-tissue suspension was prepared. This was found capable of infecting ferrets and subsequently chick embryos. Attempts to infect mice failed.

This strain resembles closely, but is not identical with, the B strain (Lee) described by Francis.

I should like to thank Prof. W. D. Newcomb, FRCP, for drawing my attention to this case, and Dr. C. H. Andrewes, FRS, for his constant interest and advice.

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BLOODLESS TONSILLECTOMY UNDER LOCAL ANÆSTHESIA

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IN America and on the Continent the use of general anæsthesia in tonsillectomy has not found much favour. The reason for this is not—as is sometimes thought—a lack of skill on the part of the anæsthetist, but because it is believed that local anæsthesia has very definite advantages. Since my postgraduate days in Vienna I have performed more than 2300 tonsillectomies under local anæsthesia, and, with my present technique, claim that 90% of the operations are completely bloodless, while in the remaining 10% there is rarely more than an eggcupful of blood lost.

The essential principle of this operation is the injection of a very large quantity of 'Novutox'[1] (this proprietary preparation of procaine already contains a small amount of adrenaline) into the so-called tonsillar capsule, which acts in three ways. First, the anæsthetic properties are so great that the patient experiences no pain at all; secondly, it acts as a perfect hæmostatic; and thirdly, by its quantity alone, it forces the tonsil from its bed, forming an intervening layer of œdematous tissue.

It is claimed that by this method there is no pain whatever during the operation, and the after-pain is always much less than when a general anæsthetic has been used; the general recovery is much quicker; and the total operation time is only about 10 minutes. (With a trained team in the theatre it has recently been possible to complete seven tonsillectomies in 70 minutes.)

DETAILS OF TECHNIQUE

Preparation of patient.—About forty-five minutes before the operation the patient is given morphine gr. ¼ and atropine gr. 1/100. Ten minutes before, while the patient is still in his room, the throat is sprayed by an assistant with equal parts of 10% cocaine and adrenaline 1/1000. (When he comes to the operating theatre, the patient may complain of a lump in the throat and that he cannot swallow properly, but this is the maximum discomfort he is likely to feel.)

Injection.—With the patient seated on an ordinary chair, facing the operator, who sits on a slightly higher level, the throat is now injected. As this is the most important part of the whole operation, the operator should wear a powerful and properly focused headlight. A suitable syringe and needles should be used. A 20 c.cm. Record syringe with movable thumb and finger rings is best, for the point of the needle may then be turned in any direction without alteration of grip. The needles should be reinforced, about 5 in. long, and curved almost to a right angle at the tip, and they should

1. Novutox and procaine are sometimes thought to be synonymous. On three separate occasions, when at operation there was slight pain and slight bleeding, it was subsequently discovered that the dispenser had used procaine instead of novutox, thinking that there was no difference, and that therefore no explanation was necessary. Novutox is procaine hydrochloride containing 0·000 02 g. epinephrine per c.cm. in Ringer's solution with an addition of quinine derivatives and thymol to make it self-sterilising. Procaine is described in the *BP* as a "Local anæsthetic which when injected has a rapid action and is moderately powerful, but somewhat transitory. To obtain a prolonged and intense anæsthetic effect it is therefore usual to add a small proportion of adrenaline, with the object of delaying dispersion from the site of injection."

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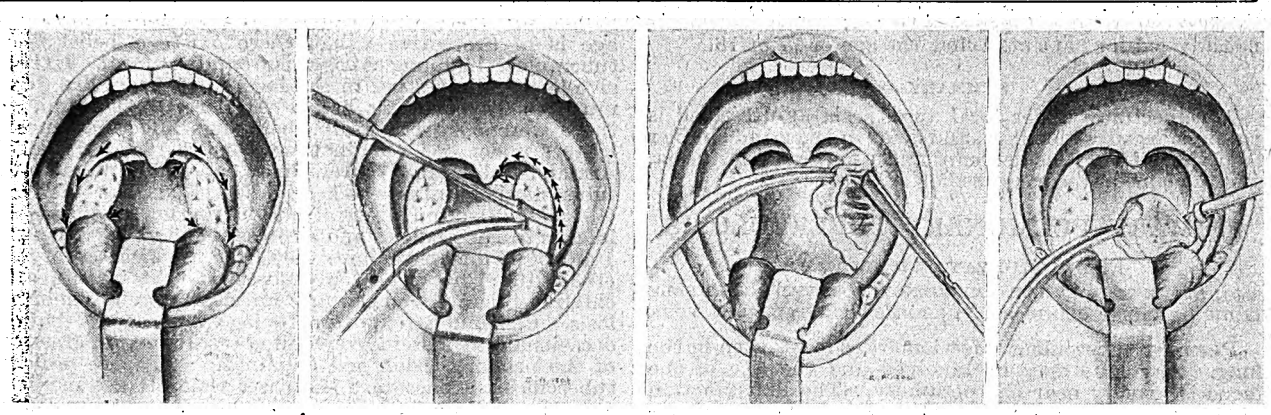

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Fig. 1—The arrows show the direction of the needle for the injections of local anæsthetic.

Fig. 2—With traction on the tonsil the incision is made from below upwards and sweeps around the upper pole and down the free edge of the posterior pillar, as indicated by arrows.

Fig. 3—The œdematous tissue behind the tonsil is broken down by blunt dissection, the upper pole being freed first.

Fig. 4—The tonsil now remains attached only by a pedicle. The snare is then tightened over the pedicle and the tonsil thus completely enucleated.

have some locking device on the tip of the syringe (Galbraith's hæmorrhoidal needle is suitable).

Five injections, each of 5 c.cm. of ½% novutox, are made into each tonsil area; in this low dilution 50 c.cm. is quite harmless. The first injection is made at the top of the anterior pillar, about 1 cm. from the margin, with the tip of the needle pointing downwards and slightly outwards. The second is made in the middle of the pillar, 1 cm. from the free border, with the needle pointing directly downwards. The third, and most important, is made at the junction of the anterior pillar and base of the tongue, the needle point being directed downwards and inwards. For the fourth injection the point of the needle is inserted behind the posterior pillar as high as possible and in an upward direction, the syringe being drawn over into the opposite angle of the mouth. The fifth injection is made behind the posterior pillar as low as possible, the point of the needle being directed downwards and outwards, with the syringe drawn well over into the angle of the mouth (fig. 1).

When the injection of both tonsils has been completed there will be considerable local swelling due to the injected fluid. The patient should wait for not less than ten minutes before the dissection is begun, so that absorption may properly take place.

Operation.—The patient is brought back to his chair and a sterile towel is fastened around his neck, with another over his head which covers his eyes. He sits with his chair drawn well forward, close to the operator's stool, one hand being placed on each of the operator's knees. An assistant standing behind the patient's chair steadies the head in his two hands, turning it gently to right or left as the surgeon may desire.

Throughout the operation it is desirable to keep up a stream of reassuring or even impersonal conversation. This may seem a trivial point, but it does help to keep the patient's attention distracted, and is always appreciated. In Vienna this is called "vocal anæsthesia."

No gag is necessary. The patient is asked to open his mouth, and the tonsil behind the œdematous anterior pillar is gripped by the volsellum. A tongue-depressor may be used in the left hand for this procedure, but afterwards this may be discarded, for the tongue is easily controlled by the depressed volsellum.

Exerting slight traction on the volsellum, an incision is now made along the free margin of the anterior pillar from below upwards. This sweeps around the upper pole of the tonsil to the base of the uvula and then down the edge of the posterior pillar for about an inch (fig. 2). With a blunt dissector the œdematous tissue behind the upper pole is gently and easily wiped away from the tonsil, and, as traction is exerted on it, the stripping down proceeds until the tonsil is attached only by the lingual prolongation (fig. 3). This stripping may be made more easily by a flat rake-like instrument with fine teeth, and, should it be necessary, force may be used in the separation of the lower half of the tonsil from its bed without hurting the patient. The tonsil must be entirely free, except for its attachment by the lingual prolongation, before its removal is attempted. It is especially important to see that it has been completely separated from the anterior pillar at its lower extremity in order to avoid damage to the pillar.

The snare may now be slipped over the handle of the volsellum, and, by a series of light shaking movements, forced down to the base of the lingual prolongation. Here it may be tightened until it cuts through (fig. 4). The tonsillar fossa will now be found to be absolutely smooth and clean, with both pillars free and intact.

Though there will have been no bleeding, I pack the fossa with a wad of moistened wool, well wrung out, before proceeding with the next tonsil. When the wool is removed at the end of the operation, the fossa should be quite dry. If there should be an oozing point it can be controlled by the application of artery forceps for two minutes.

The total time occupied in the removal of both tonsils seldom exceeds three minutes. Should there be two or more tonsillectomies on the operation list, it saves a considerable amount of time if the injections are given immediately one after the other, the first dissection being started after the last injection. With two sets of instruments it should be possible to complete five to six cases in an hour.

Postoperative period.—The patient is allowed to sit out of bed on the evening of the third day, and is sent home on the fifth or sixth day. He should be able to resume his normal life within a fortnight of the operation.

COMMENTS

It may be argued by or for the patient that the idea of a local anæsthetic distresses them, or that the operation would be almost impossible because of "sensitivity of the throat," but nearly all patients can be persuaded to favour this method if it is explained properly, and most of the apprehension at the time of operation is removed by the morphine. I can recall only one case where, with a hysterical patient, I was unable to complete the operation under local anæsthesia. The cough reflex is of course abolished by the preliminary cocaine spray. The patient should not be allowed to see or hear instruments either before or after the operation, and the possibility of seeing blood should be reduced to an absolute minimum. Most patients volunteer the statement after the operation that "It didn't hurt a bit," or "It hurt far less than having a tooth removed"; and if not actually volunteered this will be readily admitted when asked. I have never seen any complications from the injection of this large quantity of local anæsthetic.

It has not been found necessary to ligature a vessel, for should there be any oozing this can be effectively controlled either by the temporary application of an artery forceps or by inserting a cotton-wool plug wrung out dry in turpentine. Bleeding after the patient is back in bed is due either to an incomplete dissection or to having allowed the patient to leave the theatre while there was still a slight ooze from the tonsillar fossa. Secondary hæmorrhage is very uncommon.

A history of repeated quinsies is no contra-indication to the method described—in fact the method is particularly suited to such cases. Naturally the dissection is made a little more difficult by past quinsies, but not so

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much so as with general anæsthesia. The method is not advised for patients below the age of 17 or 18.

SUMMARY

Tonsillectomy under local anæsthesia as described is painless, usually bloodless, and is far quicker and simpler to perform than tonsillectomy under general anæsthesia, and the time of recovery is shorter.

PRIMARY PULMONARY TUBERCULOSIS

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PRIMARY tuberculous infection arises most often in the lung. Any lobe may be involved and the site of the focus is usually near the periphery. The first reaction of tissue to the tubercle bacillus is an exudative inflammatory one with outpouring of neutrophils and serum; later, the reaction becomes proliferative with mobilisation of monocytes, macrophages and lymphocytes. Caseation takes place in the centre, the surrounding exudate is largely absorbed and a capsule forms around the focus. The caseous centre becomes inspissated and calcified and eventually may become ossified. Similar changes occur in the lymph-glands which drain the area of lung infected, and a lymphohæmatogenous dissemination of bacilli takes place in most if not all cases. About six weeks from the beginning of infection the infected person becomes sensitive to tuberculin.[1]

The chief distinctions between primary tuberculous infection and postprimary or secondary forms of tuberculosis are as follows. Primary infection develops in those who previously have not been sensitive to tuberculin, secondary infection in those who are already sensitive to tuberculin. Primary infection may appear in any part of the lung; secondary infection usually starts in the upper third of the lung. The tracheobronchial lymph-glands become infected and enlarged in primary infection, whereas the draining lymph-glands seldom become involved in secondary infection. The caseous area in primary infection usually becomes encapsulated and calcified; in secondary infection caseous areas usually proceed to liquefaction and cavitation. Hæmatogenous dissemination, not clinically evident at the time, takes place in most cases of primary infection; in secondary infection the lesion tends to spread by infiltration and by the bronchi.

The primary focus in the lung may become completely healed in the course of time, biologically as well as anatomically, leaving behind a small scar or a calcified nodule. Though encapsulation and calcification also occur in the neighbouring lymph-glands there usually remains some caseous material within the capsule and here live bacilli may persist indefinitely. Towards the lung apices and in other organs there likewise often persist small areas of encapsulated foci of tuberculosis derived from the previous dissemination. The patient who recovers from primary infection—and most patients do recover—has become sensitive to tuberculin and has become a host to the tubercle bacillus. Should he again succumb to infection, from an exogenous or endogenous source, his tuberculosis will be of a secondary type and of a more serious form.

It has commonly been claimed that primary tuberculosis, contracted in childhood, provides an immunising protection against later infection. Experiments on guineapigs and other animals have been quoted to support this claim. This experimental work may be summed up briefly. Two groups of guineapigs, one group previously injected with a comparatively mild dose of bacilli, are injected with a strong dose of bacilli. The members of the group previously infected survive longer than the members of the other group. They do not continue to live and thrive; like the second group they also die from tuberculosis but they take a little longer to do so. This longer survival is often alluded to in terms of immunity.

All patients with phthisis have previously had a primary infection.

1. Lack of space forbids a review of the work of Parrot (1876), Kuss (1898), Ghon (1916), Ranke and others whose names are associated with the study of primary infection.

Side by side with the idea that infection at an early age is of protective value, there exists a belief that tuberculosis in young children is frequently fatal. Extensive tuberculin testing in the last thirty years has done much to disprove this belief. Drolet (1934) estimated there were 5000 cases of tuberculous infection among infants under one year in New York in 1930; 75 died. Armand-Delille (1927) was inclined to consider pulmonary tuberculosis in infants as nearly always curable. Krause (1926, 1928) often drew attention to the resistance of infants to tuberculosis and expressed the view that only 1 out of 65 infected infants died from the disease. Myers (1935, 1938) has repeatedly observed that infants and children tolerate well the first infection type of tuberculosis. Continuous exposure to heavy dosage of bacilli occasionally results in overcoming resistance, progression of the primary lesion and culmination in acute miliary tuberculosis. These are the cases that attract medical attention. Primary infection, in children and in adults, is usually overlooked.

SYMPTOMS AND SIGNS

With the onset of tuberculin sensitivity, symptoms appear. As a rule the symptoms are mild—sometimes so mild that the primary phase is passed through without the person seeming ill. The chief symptoms are slight pain in the chest, fever to about 101° F., fretfulness in children, lassitude in adults. Children fail to gain weight for a while.

Seldom are there any physical signs to indicate the presence of pulmonary disease. There is an increase of the sedimentation-rate and commonly a slight leucocytosis. In most cases a chest X-ray film demonstrates the shadows of a primary complex. The two component shadows of the primary complex, so-called after Ranke, consist of a peripheral pneumonic one and a perihilar one. The peripheral shadow varies in size from a barely discernible area of shading to one involving most of a lobe. The perihilar shadow is usually the larger of these two shadows and persists longer. There appears to be a difference of opinion regarding the frequency with which these shadows can be demonstrated on an X-ray film. From personal experience of tuberculin testing and of X-raying recent reactors over a period of years I believe that shadows suggestive of a primary complex may be demonstrated in most cases of recent infection. The frequency with which pulmonary and perihilar shadows can be seen in the chest films of patients with erythema nodosum supports this belief, for erythema nodosum, though not a specific reaction, being occasionally seen in other infections, in the majority of cases in European countries is associated with a recent primary infection. For more extensive evidence regarding the ætiology of erythema nodosum I refer the reader to Wallgren (1939) and other Scandinavian writers. When the primary infection lesions have subsided and become encapsulated, only in a minority of cases are the shadows demonstrable on an X-ray film.

Patients with a primary tuberculous infection seldom raise sputum for examination; whatever sputum there may be is usually swallowed. Smear and concentration examination of sputum-cup contents seldom yields positive results. To demonstrate the tubercle bacillus in these cases it is advisable to perform gastric lavage and to culture, or guineapig inoculate, the centrifuged residue of fasting gastric fluid. Attempting to obtain sputum with a pharyngeal swab is not reliable. It is well to repeat the gastric lavage a couple of times. The more assiduous the search for bacilli the higher will be the percentage of positive results.

TREATMENT

The first and most important procedure in the treatment of primary tuberculosis is to separate the patient from the source of infection and thus to protect him from continuous dosage with bacilli. Some of the Scandinavian writers have maintained that the dosage is of little importance—that a few bacilli may be as fatal as many. Results of contact examinations and of attempts to locate sources of infection do not support this view. It is seldom difficult to trace the source of infection when the patient is a child with a progressive primary lesion or with miliary tuberculosis, but to trace it when the patient is a child with a non-progressive type of

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primary infection is often difficult and sometimes unsuccessful. In the former instance the source is invariably found in the child's home; in the latter the source is commonly outside the home. Infants, children and adults all have a considerable resistance to primary tuberculous infection; otherwise few would survive infection. Massive infection may overcome that resistance. Lurie (1941), in his important work on inherited constitutional resistance in rabbits, has shown that the greater relative resistance exhibited by some strains can be overcome by massive infection, and that under these conditions the resistant strains develop a generalised tuberculosis similar to that which the less resistant strains develop from a small dosage. Here clinical experience and animal experiment appear to correspond.

Rest is the next most important item in the treatment of these patients. Six to eight weeks' rest is likely to give sufficient time for the lesions to become encapsulated. Most patients recover undiagnosed and untreated, anyway. Making the correct diagnosis is important, however, apart from satisfying one's urge to find the right answer, for it often puts us on the track of a source of infection. A sanatorium seems to be the least advisable place to send a patient with a primary infection. These patients should be protected from further exogenous infection, and a stay in a tuberculosis sanatorium, especially in these days of scarcity of beds, is not likely to achieve that object. They may be allowed to rest in their own homes, but observation can best be carried out in a general hospital. Being usually non-coughers and non-sputum-raisers they are not likely to spread infection.

DISTRIBUTION

With the decline of tuberculosis from the beginning of the present century until recently, a decline interrupted during the last war, it was to be expected that an increasing number of persons would escape infection during childhood and that primary tuberculosis would be found more frequently in adults. Extensive Mantoux testing in recent years in the United States, France and Germany showed a high proportion of young adults to be non-reactors to tuberculin. Long and Seibert (1937) found that the majority of students entering universities in the western states of America in 1935 and 1936 were Mantoux negative. Manderli (1940) said that about 50% of German army recruits were Mantoux negative. Meersseman (1937) found a similar condition in the French army, and has repeatedly commented on the frequency, the mildness of symptoms and the scarcity of fatal results of primary infection among recruits in the French army. Since there are few published figures it is difficult to estimate what percentage of young adults in this country are non-reactors but it may be assumed that primary tuberculosis is no longer confined to children. There appears to be no difference between primary tuberculous infection in the child and in the adult. Sweany (1941), who has done much work on the pathology of primary foci, says there is no essential difference due to age. Myers (1938) thinks that the belief in rapidly progressive disease in adults not previously infected is a myth.

During the last year ten cases of primary pulmonary tuberculosis were diagnosed in the adult medical wards of Stoke Mandeville Hospital. Three of the patients were under 20 years of age; the other seven were between 20 and 28. With the exception of two patients who developed a pleural effusion a couple of weeks after onset of illness the symptoms were mild and of short duration. Of the two patients with pleural effusion, one had a bilateral effusion, the other a contralateral effusion. These two cases afford clinical evidence of hæmatogenous dissemination of bacilli. The effusions cleared up rapidly after rest and aspiration of fluid. All ten patients recovered completely from the immediate effects of their primary infection. In each instance the chest film showed pulmonary shadows suggestive of a primary complex. In only one case was the sputum, obtained by the usual routine method, positive for the tubercle bacillus. In six cases, tubercle bacilli of human type were demonstrated by gastric lavage and culture on Loewenstein medium. To obviate any possible doubt regarding the pathogenicity of bacilli thus demonstrated guineapigs were inoculated in two cases. The guineapigs on autopsy showed active tuberculous lesions. Three of the patients had erythema nodosum. Tubercle bacilli of human type were grown on medium after gastric lavage in each case of erythema nodosum. Where circumstances permitted, follow-up gastric lavages and cultures were performed after recovery, and arrangements were made for an X-ray examination at intervals of 3–6 months. Since nine of these patients came from places outside the jurisdiction of the hospital the problem of finding the sources of their infection devolved on others. The source of infection of the tenth patient was found and isolated.

SUMMARY

An account is given of primary pulmonary tuberculosis and how it differs from postprimary or secondary forms of the disease.

Emphasis is laid on the importance of gastric lavage followed by culture, or guineapig inoculation, as the most effective method of proving the ætiology.

Except when constantly exposed to heavy dosage, or under abnormal conditions, the symptoms are mild and death during the primary infection phase is comparatively rare.

Sanatorium care, on account of the short duration of illness and the danger of continued exogenous infection to the patient, is not advisable.

Ten cases of primary tuberculous infection in young adults are briefly reported.

My thanks are due to Dr. T. Izod Bennett for permission to report these cases and to Prof. J. McIntosh and the staff of the department of pathology for laboratory assistance. Acknowledgment is made to the Director-General of Medical Services, Ministry of Pensions, for permission to publish this paper.

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CARCINOMA OF THE ŒSOPHAGUS

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THE following case seems to be the first recorded in this country of recovery from resection with anastomosis of a carcinoma of the œsophagus, although several cases have been reported from other countries.

CASE-HISTORY

A woman, aged 53, complained of dysphagia of three months' duration; latterly only fluids and small quantities of semi-solids had been swallowed. X rays showed a filling defect in the œsophagus 1½ in. above the diaphragm, and œsophagoscopy revealed a typical malignant ulcer at this level which, on biopsy, proved to be a squamous epithelioma. At a first operation on Feb. 1, 1943 (local anæsthesia, and gas and oxygen), a Kader-Senn gastrostomy was performed, the stomach being pulled as far over to the left as possible. At the same time the proximal end of the stomach was investigated; the growth was found to have extended ½ in. distal to the cardia and some mobile enlarged glands were present along the lesser curvature. At a second operation on Feb. 16 (avertin, and gas and oxygen), the thorax was opened through a long intercostal incision in the ninth space, extending from the costal margin in front to the transverse process of the vertebra behind; the lateral part of the erector spinæ was divided, as was the neck of the rib on each side of the incision to facilitate retraction. The

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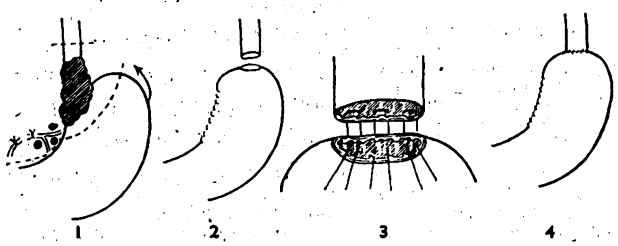
phrenic nerve was crushed and the lower part of the lung freed by cutting the ligamentum latum pulmonis. The mediastinal pleura was incised and the œsophagus explored; the growth was found to be freely mobile and there were no obvious metastases in the mediastinum. The diaphragm was split from the œsophageal opening to the periphery—a finger in the hiatus helping greatly in its division—and the abdomen entered. The spleen got in the way, so it was removed, and the vessels along the left half of the greater curvature of the stomach were tied and cut. The coronary artery was divided between ligatures and the glands stripped from the lesser curvature towards the cardia, which was then freed from the medial part of the hiatus; the œsophagus was separated upwards for about 4 in., care being taken not to injure its blood-supply, the long lower œsophageal arteries from the aorta. The œsophagus, cardia, and stomach could now be delivered easily for resection, which was carried out between clamps placed well above and below the growth (fig. 1).

The anastomosis was performed on the lines suggested by Ogilvie,[1] depending on the observation that the fundus of the stomach can be pulled much higher into the chest than can the cardia, in fact as high as the neck of the fourth rib. The line of gastric resection was closed in two layers, the fundus was pulled up and clamped, and a fresh opening made into its highest part (fig. 2). The posterior suture line followed the procedure used by Grey Turner in performing Billroth I gastrectomy, where the posterior Lembert stitch is replaced by a line of three interrupted through-and-through mattress sutures piercing all the coats (fig. 3). When these are tied the posterior lips of the anastomosis are brought into beautiful apposition for the second continuous through-and-through stitch. The anterior part of the anastomosis was completed in two layers in the usual manner (fig. 4) and a few reinforcing sutures were added back and front. When



Stages of resection and anastomosis.

the clamps were removed the œsophagus contracted like a concertina so that the suture line lay at the level of the arch of the aorta, but without any tension. Part of the opening in the diaphragm was closed and the rest sutured round the middle of the stomach so that an artificial diaphragmatic hernia was produced, and the chest wall closed in layers. A water-sealed drain was inserted in the pleura through a stab wound in the 11th space posteriorly. The operation proved relatively easy and was completed in 1 hour 40 min., during which time a pint of blood was administered by means of a continuous intravenous drip.

The specimen showed a malignant ulcer 2 in. × 1½ in., not extending completely round the œsophageal lumen, about three-quarters of it being in the œsophagus and the rest in the stomach; the glands contained macroscopic growth.

The patient was not very shocked, and next day was remarkably well. She was kept on gastrostomy fluids only for 24 hours, when she was allowed sips of water, and at the end of three days was drinking freely. She was swallowing semi-solids in ten days, and meat and vegetables in three weeks, when her gastrostomy tube was discarded. Convalescence was retarded only by a small loculated empyema which was drained by a separate intercostal catheter, and 3 oz. of pus were eventually coughed out of the original stab drain hole at the end of 6 weeks. She left hospital perfectly fit and swallowing well two months after operation; radiography showed uninterrupted passage of barium. At the end of five months patient was still in good health and swallowing without difficulty.

This fortunate result was due in large measure to the happy conjunction of an operable growth with a relatively young patient. Most carcinomas of the œsophagus occur in old men, and when they do not they are often inoperable by reason of fixity or metastasis. A really operable case will, however, occasionally be encountered; the radiotherapists claim that in this field they can beat the surgeons, but they have yet to show that they can successfully treat carcinoma which has entered the abdomen.

A pitfall might be quoted from a similar case operated on about a year ago. I thought to counter the danger of infection by performing the operation in two stages, and finished the first stage at the freeing of the parts; the fundus of the stomach was hitched up to the neck of the fourth rib by a stitch which unfortunately went too deep, penetrated the mucosa and cut out, and the patient died ten days later of a gastric perforation into the pleura.

I should like to record my debt to Prof. Grey Turner's work on œsophagectomy and Surgeon Rear-Admiral G. Gordon-Taylor's on thoraco-abdominal surgery; to Brigadier W. H. Ogilvie for suggesting the details of the operation; to Mr. Libero Fatti, of the Middlesex County Council, for coaching in thoracic surgery and assistance at the operation; and to Dr. Arnold Barnsley for a perfect anæsthetic.

1. Ogilvie, W. H. *Brit. J. Surg.* 1938–39, 26, 10.

Medical Societies

EUROPEAN ASSOCIATION OF CLINICAL PATHOLOGISTS

AT the first general meeting, held in London on Nov. 26 and 27, with Dr. S. C. DYKE, the president, in the chair, the association adopted a constitution and made plans for the establishment of local branches on the continent of Europe and for the interchange of workers in clinical pathology between laboratories in European countries after the war.

At the scientific meeting Dr. H. BAB (Berlin) discussed the clinical symptoms of *adrenocortical hypo- and hypertrophy*, and showed photographs of cases of dwarfism, gigantism and intersexuality caused by disturbances of the action of the adrenal cortex and illustrating the effects of preparations embodying its active principles.

Dr. M. MANDELBAUM (Munich) described an *organism of the Neisseria group* isolated from mice, which within two hours of being brought into contact with high dilutions of any of the sulphonamide drugs showed characteristic morphological changes. Dr. Mandelbaum suggested the use of this organism for testing the therapeutic value of new sulphonamides.

Prof. S. JELLINEK (Vienna) demonstrated that the reaction of the tissues to *electrical lesions* is entirely different from burns due to heat. Tissues affected by electricity show distortion, and though they may come to harbour micro-organisms they do not become truly septic. Professor Jellinek strongly deprecated the treatment of electrical lesions as true burns.

Dr. H. POLLAK (Prague) recorded observations that the hippuric acid test showed a deterioration of liver function in patients with peptic ulceration and improvement in liver function after successful treatment of the gastric conditions. He pointed out that the test could give valuable information as to the fitness of the patient for surgery. Prof. M. REISS (Prague) had found that the *shock* induced in rats by the intraperitoneal introduction of hypertonic glucose could be largely prevented or neutralised by the exhibition of corticotrophic hormone. Withdrawal of this hormone by ablation of the hypophysis rendered the animals more susceptible to shock. He suggested that shock could be more readily treated with corticotrophic hormone, which stimulated a whole series of hormonic responses, rather than with cortin or similar preparations of the adrenal cortex alone. Professor Reiss showed a hand hæmatocrit for field use, capable of being worked from any rapidly rotating wheel such as that of a jacked-up motor-car.

Dr. J. UNGAR (Prague) discussed the principles underlying the testing of chemotherapeutic substances in vitro, in vivo and in tissue culture.

DEMONSTRATIONS

Dr. B. L. DELLA VIDA (Rome) demonstrated crystals of the various types of drugs of the sulphanilamide group appearing in the urine of patients under treatment; Dr. ELIZABETH DELIKAT (Bratislava) films and cultures

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from a case of acute and fulminating pulmonary aspergillosis; Dr. I. FRIEDMANN (Prague) the preparation and use of dried egg powder as a substitute for fresh eggs in the preparation of media for the cultivation of tubercle bacilli; and Dr. F. PICK (Prague) microscopical sections from the organs of a child showing extensive cellular reactions which had been variously diagnosed as infectious granuloma and a congenital lipoid dystrophy.

ROYAL SOCIETY OF MEDICINE

AT a meeting of the Section of Psychiatry on Dec. 14, with Dr. W. NORWOOD EAST, the president, in the chair, Dr. JOSHUA BIERER discussed

A New Form of Group Psychotherapy

It has been asked, he said, why the discoveries of modern psychotherapy have not been extensively applied in mental hospital practice. Until recently we had found no practical method of using them, but this objection, he feels, no longer holds good. Mind and body are one entity, and this entity is part of a larger entity—society. A man working in industry lacks the chance to develop initiative and responsibility. In the dissatisfaction of people during the past thirty years he sees a reaction not to their economic situation but to psychological slavery. He described an experiment in the form of patients' social clubs, two of them in a public mental hospital and four attached to the outpatient departments of voluntary hospitals. The clubs were started with three main ideas. First, it was felt that patients robbed of freedom might improve if they were given a temporary illusion of freedom in the club. Secondly, they might improve faster and relapse less readily if they were trained in hospital to mix with other people socially and encouraged to accept responsibility and use initiative. Thirdly, helpful situations might be contrived for them in the club. Patients dread the loss of freedom entailed in mental hospital care, especially since the period of imprisonment is indefinite. The possibility of being a voluntary patient is still little known. Clubs were started by gathering a few suitable patients together, putting the idea before them and asking them to develop it. They were ready to accept the responsibility and did not lack ideas. The first club began by meeting three times a week, but the war made it necessary to reduce the meetings to once a week. The club council meets separately once a week and there are occasional subsidiary meetings. It is run on democratic lines, a fresh group of officers being elected every three months; the chief officers are chairman, vice-chairman, secretary, and conveners of magazine, sports and house committees. The frequent changes of officers give more members a period of responsibility and a chance to use initiative. The council makes out the programme of meetings, considers suggestions and complaints of members, and organises extra events. Members of the hospital staff can attend the socials only by invitation from one of the patients, which helps the patients to feel that they have an opportunity to give instead of always receiving. Patients become eligible for the club on the recommendation of their doctor; they are introduced as guests by members, and are elected at the next general meeting. The first club was for acute patients and non-deteriorated chronic patients. In 4 years 300 have attended it, with an average attendance of 50. Members are of both sexes; they range in age from 15 to 70, and have almost as wide a difference in social and intellectual standards, which has not proved a drawback. They were suffering from schizophrenia, anxiety states, depression, neurasthenia, paranoia and so on. The meetings undertook community work, discussions and lectures, card-drives, dancing, sports and rambles, and preparation of food. The officers had training in the running of a second club for chronic patients.

Difficulties have of course to be overcome. The relationship between the doctor and the group inevitably differs from that between the doctor and an individual. Most psychotherapists, in Dr. Bierer's experience, are schizothyme rather than cyclothyme, and though they learn to overcome their shyness with individuals they may have difficulty in handling a group. The transference of a patient to his own psychotherapist may conflict with his transference to the psychotherapist guiding the club. The relationship of the patients to each other has happily been good, showing none of the gossip, jealousy and petty encounters found in clubs for normal people. In order to give patients a real sense of freedom of action any work done by the staff must be behind the scenes, and they must behave like ordinary club visitors. Starting with the belief that the patients must be trusted with as much freedom as possible they had to be prepared to take a certain amount of risk; but there have been no unpleasant incidents in 4 years, though in two cases couples who met at the club subsequently married. For many patients the experience and responsibility of serving on the council renewed self-confidence. A few months ago a second club was started for chronic and deteriorated patients; this is not yet self-governing. Meetings encourage collective activities, community singing, simple games and dancing. Ex-officers of the first club run it and it gives them joy to find they can provide something which their less fortunate fellows appreciate.

Outpatient clubs have been founded to help discharged patients to maintain the social adjustment begun in hospital, and possibly to reduce relapses. Nearly every patient in the outpatient department has difficulty in adopting himself socially, and many have no social life at all. To avoid stigma, clubs meet in buildings outside the hospital. Membership is not limited to patients; anyone who is properly introduced may become a member. Doctors take no office, but one is always present. Meetings are held weekly and the light expenses are met by the members. Clubs are now in action in East Ham and Southend (for Runwell and Southend General Hospital patients) and in connexion with Bart's and Guy's psychiatric outpatient departments. Average attendance at Bart's club is 30, and at the others 15. These clubs, like those within the hospital, have provided social opportunities for those who for one reason or another felt cut off from their fellows. Dr. Bierer feels that the clubs combat shyness, loneliness, general and social inferiority feelings, sexual maladjustment, lack of incentive and aim in life, inability to coöperate with others, claustrophobia and agarophobia, parental domination, acute disappointment and physical defects. He suggested that other mental hospitals and outpatient departments might organise such clubs. "By helping the patient to make human relationships," he concluded, "we destroy the proof of his failure and so begin rebuilding a healthy personality."

DISCUSSION

Dr. E. B. STRAUSS said that the Bart's outpatient club had proved a valuable auxiliary to treatment. He pointed out that Dr. Bierer saw the patient's problem in terms of frustration at the level of the herd or community instinct. At the bottom of most psychological maladjustment is lack of a sense of personal validity; and any interests which restored this sense are acceptable.

Dr. J. MAXWELL JONES asked whether any ordinary club in the district would not serve equally well.—Dr. T. P. REES endorsed the opportunity which a club gives for the sexes to meet and mix. There is too rigid a separation of the sexes, he considers, in most mental hospitals. They have a patients' club at Warlingham, though not, he admitted, run on the democratic lines advocated by Dr. Bierer. At one time the club-room was open all day, but it proved so popular that the patients went there when they should have been engaged in occupational therapy; so that it is now open only from noon till 7 PM. He felt he would probably try out Dr. Bierer's methods.—Dr. M. B. BRODY spoke of the increased rapport established between doctor and patient, thanks to attendance at the club.

REPLY

In replying Dr. BIERER referred to mass psychotherapy, by suggestion; class psychotherapy, by lectures to a group; and group analysis, in which the problems of one member are analysed by another member of the group. Social clubs, he felt, offer a fourth type of group psychotherapy. In club discussions, for example, it is possible to ask a patient to talk about some problem parallel to his own; and he will do so without realising at the time that he is discussing his own problem, though later he profits by the increased insight he has gained

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from it. Again, situations can be contrived to break down self-doubt. Thus a girl who fancies herself unattractive will attend her first club meeting in apprehension; the doctor arranges without her knowledge that one man after another asks her to dance.

The CHAIRMAN in summing up mentioned the lack of opportunity for the sexes to meet in penal institutions. It can be partly alleviated, he said, by having a woman nurse on the male side of the institution.

SUDAN MEDICAL SERVICE

THE activities recorded in the report of the Sudan Medical Service for 1941 would be creditable in times of peace and are doubly so under the stress of war—there is no evidence of restrictions either in performance or production. The general health of the Sudan remained satisfactory and the incidence of epidemic disease below the average. The small amount of malaria in the Northern Sudan is attributable to favourable climatic conditions. The strain of war and lack of leisure took their toll of British officials, who showed a higher incidence of sickness and consequently a greater number of deaths and invaliding than for some years past. Cerebrospinal fever topped the list of epidemic diseases, and some 1824 cases were reported with 459 deaths, which compares favourably with 1936 when there were 13,440 cases and 8906 deaths. Diphtheria was not of major importance. Relapsing fever incidence was above the average, with 3028 cases and 110 deaths. The small amount of smallpox (46 cases with none fatal) bears testimony to the efficacy of the extensive vaccination campaigns of the last four years and to the lymph produced in the local Stack laboratories.

For the first time, a case of tick typhus was reported in Equatoria Province. Yellow fever was absent during the year. Bilharziasis (*B. hæmatobia*) constituted no real danger, but remains as a potential menace to the irrigated areas of the Gezira. The incidence of blackwater fever (28 cases with 9 deaths) is not great; Arab Sudanese provided the greater number—not a single European was affected. Guineaworm is prevalent in Equatoria Province, the Nuba Mountains and the Bor district of the Upper Nile Province, but now that anti-guineaworm wells have been constructed in many endemic areas, it is reasonably hoped that there will be a reduction in this disease. Regarding dysentery, it is rather surprising to read that of 3661 cases admitted to hospital 2924 were diagnosed as amœbic and only 737 as bacillary in origin, though the war must have considerably increased the incidence of the latter. On the other hand, the incidence of enteric fevers remained remarkably low, only some 129 cases being recorded. Among the 477 cases of kala-azar reported there was a remarkably high mortality, with 138 deaths; these must be largely attributed to the recent campaigns in the very worst endemic centres. In spite of treatment with 'Stilbamidine' many patients succumbed and the Sudan variety appears to be particularly resistant to any form of treatment. Under the heading of cutaneous leishmaniasis there was one example of espundia (mucocutaneous leishmaniasis) which has occasionally been recorded before from the Sudan. The 46 cases of oriental sore came mostly from the Kordofan Province. Of trypanosomiasis 125 cases were reported in Equatoria Province, 47 in a fresh outbreak in the Meridi district and 1 in the Kajo Kaju subdistrict. A pass system was organised between the Sudan and Belgian Congo, and between the Sudan and French Equatorial Africa, in order to limit the spread of the disease and enable people to visit relatives.

The section on public health and hygiene, by Lieut.-Colonel H. A. Crouch, describes special measures for the control of yellow fever in view of the remarkable outbreak in the Nuba Mountains in 1940. There has been no recrudescence. Immunisation has been carried out on an extensive scale for all members of the Forces, all officials, police, railway and steamer personnel, medical staff, school-children, missionaries and others going south of Khartoum. All guards and employees on aerodromes were included and mass inoculation was undertaken in villages near aerodromes, posts and lines of communication. The campaign against aedes mosquitoes has been a feature of public health work, necessitating the employment of extra staff.

POSTWAR INTERNATIONAL COLLABORATION IN MEDICINE.—Dr. Melville Mackenzie has chosen this subject for the Harben lectures which he is to deliver to the Royal Institute of Public Health and Hygiene, 28, Portland Place, London, W.1, on Jan. 24, 25, and 26 at 3 PM.

Reviews of Books

Permeability of Natural Membranes

H. DAVSON, D SC, associate professor of physiology, Dalhousie University, Canada; J. F. DANIELLI, D SC, AIC, Beit memorial research fellow and fellow of St. John's College, Cambridge. (Cambridge Univ. Press. Pp. 361. 25*s*.)

THE authors have undertaken a task long overdue in compiling the available evidence—for much of which they are personally responsible—on the fundamental question of permeability. They are not too technical for any medical reader who is willing to skip a little. Serious students of physiology and biochemistry, and teachers of these subjects, will find much valuable information and many new ideas. The behaviour of the various kinds of membrane encountered in the body is succeeded by a summary of modern views on the nature of the cell membrane. Equilibria, and partial or selective permeability of a membrane are discussed. Experimental methods are explained, and the tricks employed by the erythrocyte to deceive investigators are frankly exposed. The book is rounded off by chapters on *hæmolysis*, secretion, renal function, and the kind of theory of permeability which seems to be emerging from the available evidence. The authors claim no more than to draw attention to the transition from qualitative to quantitative studies of living membranes. They write critically and they neither oversimplify nor elaborate unduly on inadequate evidence.

Annual Review of Biochemistry.

(Vol. XII.) Editors: J. M. LUCK, J. H. C. SMITH, Stanford University. (Lewis. Pp. 704. 31*s*. 6*d*.)

THE articles in this volume are well up to the standard we have come to expect. Lipman's section on the biological oxidations and reductions gives a good summary of the present position, and contains some valuable notes on the dropping mercury electrode, and the use of polarography in the study of enzymes. The proteolytic enzymes are discussed by Herriott in a timely review of a subject about which biochemists tend to remain rather old-fashioned. Besides such usual subjects as the steroids, proteins and amino-acids, vitamins, and synthetic drugs the book covers the microchemistry and electron microscope.

Hermaphroditos

The Human Intersex. A. P. CAWADIAS, MD DURH., FRCP, physician, St. John Clinic and Institute of Physical Medicine, London. (Heinemann. Pp. 78. 15*s*.)

THIS book is an extension of Dr. Cawadias's Thomas Vicary lecture to the Royal College of Surgeons. It is also an improvement on it, for some of the unduly optimistic claims for endocrine treatment then made have been wisely omitted. The author exposes and explains historically the fiction of the true hermaphrodite and proceeds to elaborate in detail and with ability his personal views. These rest upon certain premises with which all students would agree.

> "A male is not a male because he has testes; he has testes because he is a male, and similarly a female is a female not because she has ovaries but has ovaries because she is a female."
>
> "Intersexuality is a normal phenomenon. There is no absolute male nor absolute female."
>
> "The system of sex determination . . . consists in an interaction of a biological field, a sexoformic impulse and a biological environment."
>
> "The biological field of the human embryo is bisexual. . . . On this field the organising sexoformic impulse . . . acts," always unisexually, through the genic sex organisers and the endocrines.

But though this hypothesis is ably developed, there are curious omissions which deny to this book the rank of a classical monograph. The experiments of Greene and his associates in America, which are favourable to the thesis, are not mentioned. Goldschmidt is too cavalierly dismissed, although in many respects he too is a friend. There is, too, a tendency to describe at length the patients who "fit" well, and to leave unmentioned such awkward cases as Guldberg's example of uniovular twins, one female and one gynandroid.

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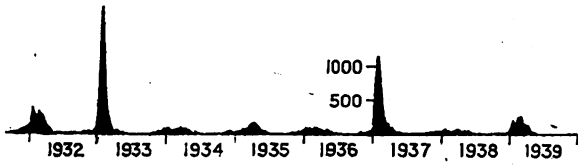
THE LANCET

LONDON: SATURDAY, DECEMBER 25, 1943

INFLUENZA

THERE is an inevitable fascination in contemplating charts of the varying annual toll of influenza, in considering why the disease hits us in one year and not in another, and in peering thence into what lies ahead. This pastime has been rather more profitable since 1933 when a virus, now called influenza A virus, became amenable to laboratory study, and still more so since 1940, when a second agent, influenza B virus, was recognised. We can now be sure that there is every winter a basic level of respiratory infection which is not due to either virus, and that in some years a superimposed wave is caused by virus A, at other times by its brother, B. In Britain for the last decade these waves have all been in the early months of the year. Before B was recognised, there were widespread A outbreaks in 1933 and 1937 with a lesser one in 1935. The accompanying chart, reproduced



by courtesy of the Ministry of Health, shows deaths from influenzal pneumonia in London and the great towns. A minor outbreak in 1939 was partly due to A, partly to B; another small-scale prevalence in early 1941 was associated with virus A only. Three papers in this issue record that what little influenza there was at the beginning of 1943 was largely caused by virus B, not at all by A. Clinically this influenza B was not to be distinguished from A, nor from certain other influenza-like illnesses of unknown cause in which on virus could be detected. None of the B outbreaks so far on record has been very widespread or severe. It seems that major peaks on the influenza curve mean that virus A is at large; and we understand that A is the culprit in the current epidemic. It is odd that A viruses are harder to establish in ferrets and mice when the epidemic is a minor one; and B seems even trickier to work with. STUART-HARRIS, GLOVER and MILLS failed to get any 1943 B strain to produce symptoms in ferrets or mice, or to infect chick embryos. HIMMELWEIT, however, persuaded one strain to infect chick embryos, though not mice, after many passages through ferrets.

One point brought out by these papers is that right at the end of last winter's influenza season, just as virus B infections were petering out, virus A turned up and caused a few local outbreaks right into the summer. Here may well be an explanation of why influenza burst exceptionally early this winter; the virus was probably already in our midst, waiting for the seasonal conditions suitable for its rapid spread. Many will note that after four years of war an epidemic has come at a rather abnormal season; they will think of 1918 and will be anxious lest a repetition of the disastrous pandemic of that year may be imminent. It is true that a very early outbreak allows time for many unpleasant things to happen before spring, including a possible second wave caused by virus of changed character. But we may be comforted by the fact that by June, 1918, almost at the beginning of the first wave of the pandemic, there was a tendency for increased mortality to invade the age-groups under 30. There is now general agreement with the far-seeing GREENWOOD that this tendency was the cardinal feature of "1918." As yet there is fortunately no such tendency in the current visitation, but it is to be hoped that practitioners will keep a sharp look-out for this danger-signal. It remains to be seen whether there is any truth or significance in the influenza fatalities in young factory-workers just reported in the lay press as occurring in Berlin.

Victims of influenza may like to know the latest news about the properties of the virus which is hitting them. Earlier estimates [1] gave the size of influenza A as 80 to 120 (probably 90 to 100) mμ. Work published in the United States earlier this year [2] suggested that this estimate was too high and that the virus was actually amongst the smallest known, only 10–12·5 mμ in diameter. The apparent larger size was, so it was asserted, due to carriage of the virus on larger particles coming from the animal tissues. Electron micrographs were reproduced showing minute bodies of the order of 10–15 mμ. These unexpected findings were not confirmed by work over here, as recent correspondence in our columns testified.[3] Work from another group in the USA [4] now makes it probable that original British measurements of the virus's size were not far out (80 mμ is the figure given) and that the small particles seen in the first electron micrographs did not represent the virus at all. This group go further and reproduce micrographs of their own showing particles about 80 mμ across presumably representing the virus. "Some of the images are essentially round and reveal, centrally placed, a circular region of greater density than that of the surrounding structure . . . other images appear to be kidney-shaped. . . . This variation in form could be due to kidney- or bean-shaped particles seen lying in the field in various positions with respect to the indented region." Influenza B [5] looks much the same but is significantly larger, about 100 mμ across.

FORMATION OF LYMPH IN THE LUNGS

THE literature of lymph formation has been well reviewed of recent years,[6-11] and to DRINKER and his colleagues at Harvard we owe a debt for their illuminating observations and opinions. They paid particular attention to the lungs, and their achievements have been due to the successful collection of lymph from the lungs of the dog; after which it was

1. Elford, W. J. and Andrewes, C. H. *Brit. J. exp. Path.* 1936, **17**, 422.
2. Chambers, L. A., Henle, W., Lauffer, M. A. and Anderson, T. F. *J. exp. Med.* 1943, **77**, 265.
3. *Lancet*, Oct. 23, p. 526, Nov. 6, p. 588.
4. Taylor, A. R., Sharp, D. G., Beard, D., Beard, J. W., Dingle, J. H. and Feller, A. E. *J. Immunol.* 1943, **47**, 261.
5. Sharp, D. G., Taylor, A. R., McLean, I. W. jun., Beard, D., Beard, J. W., Feller, A. E. and Dingle, J. H. *Science*, 1943, **98**, 307.
6. Drinker, C. K. and Field, M. E. Lymphatics, Lymph and Tissue Fluid, Baltimore, 1933.
7. Warren, M. F. *Ann. Rev. Physiol.* 1940, **2**, 109.
8. Drinker, C. K. and Yoffey, J. M. Lymphatics, Lymph and Lymphoid Tissue, Harvard, 1941.
9. Weiss, S. *Bull. N.Y. Acad. Med.* 1942, **18**, 93.
10. McMaster, P. D. *Ann. Rev. Physiol.* 1943, **5**, 207.
11. Drinker, C. K. The Lymphatic System, London, 1943.

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a short step to the measurement of lymph flow under a variety of experimental conditions. Appreciation of the problems involved demands some knowledge of the anatomical arrangement of the lung lymphatics. For this knowledge WILLIAM SNOW MILLER[12] is chiefly responsible and his views may be stated briefly as follows:—

In the human lung the deep lymphatic system consists of four groups of lymphatics, the peribronchial, periarterial, perivenous and septal (interlobular), which communicate with one another especially where the bronchi divide. MILLER states that no lymphatics are found beyond the alveolar ducts, from which region the four groups may be said to have a common origin. In general the lymph flow in the deep lymphatics is towards the lung hilum; there are, however, but few valves except at the hilum and just beneath the pleura where the venous lymphatics join the pleural lymphatics. On the other hand, the superficial lymphatic plexus of the pleura is provided with numerous valves, those in the main collecting trunks of the plexus opening towards the hilum. The deep and superficial lymphatic systems anastomose in the following manner: short connecting lymphatics accompany the branches of the pulmonary veins draining the pleura—they connect the pleural lymphatics with the lymphatics draining the alveolar ducts. These connecting lymphatics have valves which open towards the pleura and prevent the flow of lymph from the pleural lymphatics into the deep lymphatics. It follows that the zone where the short connecting lymphatics join the deep lymphatics draining the alveolar ducts may be considered as a lymph "shed." The "shed" is situated just beneath the pleura and averages 2–3 mm. in depth. Thus lymph formed in this zone may flow towards the lung hilum by way of the deep lymphatic system or towards the hilum by way of the short connecting lymphatics and superficial pleural lymphatic plexus. This means that the short connecting lymphatics furnish a bypath for the lymph by way of the pleural plexus in the event of obstruction to the deep lymphatic system.

From MILLER'S observations it would be expected that a transudate or exudate formed from the blood of the capillaries supplying the alveolar "ducts" and alveoli would find its way into the adjacent tissue spaces and be taken up by the lymph channels in the region of the alveolar ducts, whence it would be carried to the hilum of the lungs both by the deep lymphatics and by the superficial lymphatic plexus.

Under normal conditions the hydrostatic pressure in the pulmonary capillaries is probably below the osmotic pressure of the blood proteins; hence, if the pulmonary capillaries resemble those of the systemic circulation, they are organised for ridding themselves of excess fluid but not for the formation of fluid.[9,16] That the lungs can absorb large quantities of water has been demonstrated by COLIN[13] who gave 21 litres of water to a horse intratracheally in 3½ hours without detriment to the animal. Whether all such fluid is absorbed by the blood capillaries is unknown, but it is not unlikely that some finds its way directly into the lymphatic spaces. The Harvard school have shown that the reverse process of transudation and exudation with consequent formation of lymph is potentiated by anoxia, by the inhalation of irritant gases and by strong respiratory movements. In the first two of these conditions capillary damage leading to greater permeability is the important factor, while the effect of respiratory movements is attributed to increased negative pressure in the chest which tends to promote pleural as well as pulmonary exudates even if oxygen lack is avoided. These Harvard experiments have their counterpart in the investigation of YAMADA[14] who found pleural fluid in 29% of Japanese soldiers at rest and in 70% following severe muscular work. DRINKER and WARREN[15] suggest that in cardiac dyspnœa there is a tendency for fluid to be drawn from the pulmonary capillaries by the increased negative pressure, and, if anoxia is present, the resulting capillary damage augments this fluid formation. A pernicious process is thus set up; for the greater the amount of alveolar fluid, the less is the chance of oxygen reaching the blood in the capillaries. Administration of oxygen under anoxial conditions diminished the lung lymph flow, and this shows the importance of anticipating the start of the pernicious process by early oxygen treatment. DRINKER and WARREN believe that clinically we may fail to appreciate the patient's need for oxygen until too much time has passed: with present criteria the decision that oxygen treatment is needed usually comes about twelve hours too late. Incidentally, though there is general agreement that an increased capillary pressure favours transudation, it is probable that in the absence of the capillary damage this factor has been overestimated; thus "back-pressure" effects on the lung capillaries are not of primary importance.[9,16]

That the capillary wall allows protein to pass in either direction is indicated by the normal formation of lymph in the lungs and by experiments which show that foreign protein injected into the airway passes slowly into the blood-stream.[17] These issues are brought into focus by the admission that without more precise knowledge of the hydrostatic pressure in the pulmonary capillaries, and of the degree of permeability of the membrane, transudation phenomena cannot be interpreted. The assumption that the capillary pressure is midway between the pulmonary arterial and pulmonary venous pressure is probably unjustified; indeed it is likely that both pressure and permeability vary widely from moment to moment in any given part of the vascular bed because the state of the capillary is constantly changing. In this connexion DRINKER and WARREN[15] dismiss the idea that nervous mechanisms control the pulmonary vascular bed, but their view is hardly in accord either with experimental evidence[18] or with clinical experience.[16] The question seems to be not whether nerves exert control on the pulmonary vessels but rather to what degree and on what portions of the vascular bed they do so. All the lung capillaries are not open at one and the same time, for they have been seen to be continually opening and closing.[19] The blood flow even in fully open capillaries may show wide changes and on occasion reversal. Such activity, whether due to nervous or humoral mechanisms, will surely have some influence on the capillary pressure and on the permeability of the capillary walls. It is known, for instance, that the gaseous content of the blood influences capillary permeability; it is increased by a low oxygen and high carbon-dioxide content. One can imagine, therefore, that sluggish

12. Miller, W. S. The Lung, Baltimore, 1937.
13. Colin, G. Traité de physiologie comparée des animaux, Paris, 1873, vol. II, p. 109.
14. Yamada, S. S. *Z. ges. exp. Med.* 1933, 90, 342.
15. Drinker, C. K. and Warren, M. F. *J. Amer. med. Ass.* 1943, 122, 269.
16. Luisada, A. *Medicine*, 1940, 19, 475.
17. Drinker, C. K., Warren, M. F. and MacLanahan, M. *J. exp. Med.* 1937, 66, 449.
18. Daly, I. de Burgh, Harvey Lectures, New York, 1936.
19. Wearn, J. T. et al. *Amer. J. Physiol.* 1928, 85, 410.

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capillary blood flow to an ill-ventilated air sac will lead to increased capillary permeability because the regional oxygen tension will be low and the carbon-dioxide tension high. Unequal alveolar ventilation has long been recognised as important, and if it is associated with unequal alveolar capillary blood-supply, may not this explain the patchy distribution of œdema fluid in the lungs observed by SOMA WEISS? We may add that the mechanism of neuropathic pulmonary œdema may be closely bound up with the nervous control of the pulmonary vascular bed; the arterioles and possibly venules are supplied with nerves, but the evidence for the capillaries being so supplied is not unequivocal. Here there is a wide field for exploration; but if advances are to be made it will require all the experimental skill that DRINKER has brought to bear on his own problems.

The conditions governing pleural transudation differ from those for alveolar transudation. The significance of MILLER'S work on the blood-supply to the pleura has not been fully recognised. In man the pleura is supplied by the bronchial arteries derived from the systemic circulation. Are we to regard these systemic capillaries as having the same permeability properties and pressure relations as those supplying the alveoli? Clearly not without direct evidence that it is so. A priori, it would be expected that the hydrostatic pressure in the pleural capillaries would be greater than that in the alveolar capillaries, and (other things being equal) transudates would arise more easily from the pleural capillaries. The fact that the bronchial arteries are the source of supply to the pleura in some animals, and the pulmonary artery in others, might be put to good use in planning further experiments.

Distension of the lymphatics almost always accompanies lung œdema: it has been observed with anaphylactic shock, lung blast, sudden decompression, poisoning by irritant gas, and bilateral vagotomy. Presumably it indicates that the rate of formation of transudate or exudate exceeds the rate of removal by the lymphatics. Since the four main groups of deep lymphatics communicate with one another, they may be regarded as a parallel network. It would be expected, therefore, that if one group shows distension, the remaining three would also be distended. But in animal experiments distension is apparently not always uniform. The differences may arise because of local obstruction of lymphatics by the pressure of œdema fluid or because the systems of deep lymphatics in certain laboratory animals differ from those in man. It follows too from MILLER'S description for man that if the deep lymphatics are fully distended, the superficial plexus should be likewise distended; but under experimental conditions this is not always so.[20] Such discrepancies may appear of minor importance but they must be explained if the results of animal experiments are to be applied to pathological processes in the human lung.

20. Trowell, O. A. *Quart. J. exp. Physiol.* 1943, **32**, 203.

LIVERPOOL SCHOOL OF TROPICAL MEDICINE.—The work carried on in the department of tropical medicine under the late Prof. Warrington Yorke is to be continued in two new departments which the council of the school have created. Dr. A. R. D. Adams is to take charge of the practice of tropical medicine and Dr. E. M. Lourie of research in chemotherapy.

MEDICINE AND THE CHURCHES

THE mistrust between orthodox religion and progressive science has limited the usefulness of both. "With increase of knowledge," writes Sir RICHARD GREGORY,[1] "much of the mystery upon which religious beliefs are based is revealed and new concepts have to be created to satisfy the rational mind. It is when there is a refusal to recognise the essential functions of progressive knowledge that conflict arises between religion and science." The changes associated with modern civilisation are, he points out, the results of scientific discovery and mechanical invention, and progress in these has never been encouraged by religious teaching. Certainly there has seldom been any noticeable zeal—on either side—for coöperation between the Church and medicine, and there are perhaps some problems of social life in which the Churches have not been willing to take their full share of responsibility. Happily there is evidence of a new spirit of alliance between medicine, the Churches, and education against preventable disease and in favour of attainable health, especially in the young.

Psychoneurosis is one of the major preoccupations of medicine today, and will still be one tomorrow. Some patients suffering from this disease require expert psychological help, but obviously many want more than that; to protect them from developing a chronic psychoneurotic state they need a philosophy that will support and reinforce them against the slings and arrows of outrageous fortune. Neither in church or school or clinic is such a philosophy easily come by; and those who aspire to provide it must have sympathy, great patience, knowledge of the world, and sanity of outlook. The efforts of a counsellor without these qualities are worse than useless—and they are not fruits that grow on every tree. Yet help of this kind is enormously valuable in the resettlement of many whose future happiness and working capacity hang in the balance. Without it they tend to "put on the strong armour of sickness"; whereas experience of men invalided out of the Services because of psychoneurosis indicates that, given the right kind of help, they can settle down to a useful life as successfully as their neighbours.

Improvement of the general health is coming to depend more and more on the coöperation of the individual. Religion and education can do much to foster the social sense—the attitude of the good neighbour—which is necessary to life in communities, and doctors are increasingly aware that their success or failure depends largely on social attitudes. Since this is so, they must resist the temptation to think narrowly in terms of their own specialty. Scientific ideas, like religious ideas, can be used in such a way as to restrict imagination instead of expanding it. The conflict between HUXLEY and WILBERFORCE at the Oxford meeting of the British Association in 1860 is felt by many to have created or perpetuated an unnecessary gulf between science and religion. It is not enough, they say, that this gulf should be bridged: the bridge could be used for joining forces in a united campaign for health of body and mind.

1. Gregory, R. A. Education in World Ethics and Science. Watts and Co., London, 1943.

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Annotations

SULPHONAMIDES AND MENINGITIC SEQUELÆ

Maddock[1] has studied sequelæ in 1075 patients who recovered from cerebrospinal fever after chemotherapy. In every case the diagnosis had been bacteriologically proved; the nurses of the American Red Cross Harvard Unit Hospital paid the follow-up visits and either saw the patients or got information about them from relatives or neighbours. The time between discharge from hospital and the visit varied from 1 month to 2 years. In all, 254 (23·6%) complained of some disability dating from the attack. Headache was the commonest sequel, being present in 117. More serious symptoms were fortunately rarer; 6 had lost the sight of one eye, 1 of both eyes; 13 were totally deaf and 24 had impaired hearing. There was one case each of hydrocephalus, spastic paralysis and facial paralysis; 10 had strabismus; 18 were said to have changed in disposition and 9 children were retarded in development. Weakness of the legs was noted in 22, and muscular pains in 28. Other symptoms included errors of refraction, nervousness, irritability, poor memory, lack of concentration, easy tiring and depression. Maddock suggests that the list appears more formidable than the facts warrant, since these sequelæ are not all necessarily permanent. Headaches, for example, usually diminish in intensity and finally disappear. A group of 31 patients reported to have disabilities were fully examined by doctors 3–8 months after the nurses had made their visits; 16 of them had completely lost their symptoms and were in perfect health; in 7 the sequelæ reported had not been due to the illness; 2 had symptoms possibly due to meningitis but beginning to clear up; and in only 9 were there permanent sequelæ due to meningitis. The dosage of sulphonamide bore no apparent relation to the incidence of sequelæ, and Maddock supposes that in many patients damage to the central nervous system is probably done at the onset of the illness and is not affected by chemotherapy.

UNDER-WATER BLAST

AN ingenious technique has been described by American workers for studying the effects of rapid compression waves on animals submerged in water. Since the results run closely parallel to those found by a number of observers[2] in man and animals exposed to depth charges, it looks as though the laboratory worker were now provided with a simple way of investigating under-water blast without the limitations and fuss imposed by the use of explosive forces.

Clark and Ward[3] describe a method of subjecting animals to shock waves in water by dropping a weight on a floating plunger. In one end of a steel U-tube filled with water or saline is loosely fitted a wooden plunger on which a rack carrying a falling weight, released from any desired distance, is allowed to fall. The anæsthetised animal is in the other end of the U-tube, within a tubular cage of hardware cloth or, if water surging is to be wholly avoided, in a tin can, open at the top and almost filled with water. The impact so produced sets up waves very like those generated by setting off an explosive under water, with primary "compression" waves of extremely short duration (1/5000 sec.) and no surge of water such as occurs when the gases of an explosive expand. By varying the weight on the rack and the distance of fall a great variety of lesions may be produced. Under extreme conditions the animals are killed in a few minutes; with lighter impacts they survive longer or recover completely. The immediate effect is a rapid slowing of the heart-rate and cessation of respiration for a few seconds to more than a minute, followed by laboured and ineffectual respiratory movements. Intrapulmonary bleeding sets in at once and may lead to early death. Although occasional animals show loss of corneal reflexes, ataxia and incoördination immediately after the blow, direct involvement of the central nervous system is exceptional and electro-encephalograms provide no evidence of concussion at the time of the impact. Autopsy findings in these animals are identical with those described by Cameron, Short and Wakeley[4] and Williams[5]: they include massive pulmonary hæmorrhage, bruising and hæmorrhage in the stomach, lower ileum and cæcum, with occasional rupture of stomach or intestines and hæmorrhage into the peritoneal cavity or lumen of stomach and intestines. As pointed out by the British workers, the solid viscera, in contrast to air-containing cavities, rarely show damage.

Some of Clark and Ward's conclusions may be briefly summarised. The greater the impact, the more damage to the animal; the larger the animal the less the effect for a given impact. The more hunched-up the animal is in the water, the less seriously is it affected. With incomplete submersion, only that part of the animal below the water level at the time of impact shows the typical lesions. (The work of Cameron, Short and Wakeley,[3] does not, however, bear out this conclusion.) Damage is greater to fully inflated lungs than to deflated lungs. Protective coverings, such as cork or sponge rubber life-preservers, save the regions covered from much of the effect of an otherwise fatal blow.

PREDETERMINATION OF SEX

FLUCTUATIONS in the sex ratio during war, discussed by Dr. Martin on p. 807, remind us how little influence we have with our posterity, even at the outset. Only in the present century has the mechanism of sex-determination been elucidated. Basically it is simple enough in man. The sex-chromosome pair in the female somatic cell consists of two equal members, the X-chromosomes. The male somatic cell, on the other hand, contains an unequal pair, consisting of one X-chromosome and a smaller Y-chromosome. When the gametes are formed, the members of each chromosome-pair separate, so that whilst all ova contain an X-chromosome, half the spermatozoa contain an X-chromosome and half a Y-chromosome. Should it chance to be an X-bearing sperm which fertilises the ovum, the result is a girl; should it be a Y-bearing sperm, the result is a boy. Many other living things exhibit an identical or very similar mechanism. It is not always, it is true, quite as simple as the scheme just outlined, but in no case can the primary determination of the sex of the new individual be termed really complicated.

It is one thing, however, to understand how a mechanism operates and quite another to control it. Many possible approaches have been attempted, though nearly always with negative results up to the present. The day is probably far off when the sex of the future child can be determined at will—or indeed materially influenced—in the desired direction. It has been shown, however, in animal experiments that a tendency to produce an excess of females or of males may be to some extent genetic; and generations of selective breeding can on occasion produce strains which do yield some preponderance of one sex or of the other. Furthermore, in drosophila much more definite means of predetermination have been demonstrated. Lethal genes have been discovered which are sex-linked and by introducing them into the X-chromosomes by breeding methods it is possible to ensure that some at least of the XY individuals, the males, do not develop. In fact, by utilising in addition genes which inhibit crossing-over (that is, the interchange

1. Maddock, E. C. E. *Bull. Min. Hlth & EPHLS*, 1943, 2, 111.
2. See *Lancet*, 1943, ii, 133.
3. Clark, S. L. and Ward, J. W. 1943, *Surg. Gynec. Obstet.* 77, 403.
4. Cameron, G. R., Short, R. H. D. and Wakeley, C. P. G. *Brit. J. Surg.* 1942, 30, 49; 1943, 31, 51.
5. Williams, E. R. P. *Ibid*, 1942, 30, 38.

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of genes between members of a chromosome pair) it is possible to produce strains which yield 100% females.

Recently, Gowen and Nelson [1] have announced the production of a strain the females of which produce 100% males, irrespective of the males to which they are mated. This result is due to a dominant gene whose action is limited to the female sex. Thus in drosophila, in one sense, complete sex-control is possible: stocks can be bred which yield offspring of one sex only, either females or males at will. The discovery of course can hardly be said to have any application to man. This is no simple matter of an injection or a pill, ensuring the arrival of a baby of the required sex. It hardly stirs the pulse to be told that some day, if the appropriate genes happen to be discovered in man, it might be possible after many generations of selective breeding to produce women whose fertilised ova of one sex or the other would die at a conveniently early stage. Primitive peoples, who eliminate unwanted babies as soon as they are born, would hardly regard the method as a practical advance.

ORIGIN AND PATTERN OF RETINAL HÆMORRHAGE

WHAT determines the distribution of retinal hæmorrhages in vascular disease and what is the anatomical reason for their pattern? In his Montgomery lecture to Irish surgeons Ballantyne [2] gives an answer to these questions based on ophthalmoscopic and microscopical findings. Three common causes of retinal venous hæmorrhages are choked disc, subarachnoid hæmorrhage, and thrombosis of the central retinal vein. The immediate cause of the hæmorrhage in all three is the obstruction to the outflow of blood from the retinal veins, and yet the distribution of the hæmorrhage is different in each case. Ballantyne explains that in healthy blood-vessels extravasation of blood through the vessel walls from back pressure will be chiefly where the vessel changes course or where it receives increased or decreased support from surrounding tissues. At the optic disc the vessels both change their course and lose support, so that when pressure suddenly rises, as in choked disc, the hæmorrhages will be situated at and around the disc. In subarachnoid hæmorrhage the rise of pressure is most sudden, and here the hæmorrhages arise not only in the retina around the disc but also in the orbit where there is lack of support for the vessel wall. Thrombosis of the central retinal vein causes widespread venous hæmorrhage throughout the retina. Here, while the actual blockage has been sudden, this is only the final phase of a progressive obstruction. The vein behind the lamina cribrosa has been gradually narrowing, and the circulation in the vein getting slower, with the result that the vein walls suffer from anoxæmia and become devitalised. At the moment of final obstruction the pressure, acting on the weakened walls, causes hæmorrhage throughout their length. The exact source of a small retinal hæmorrhage can often be estimated by closely observing its shape. Such hæmorrhages are chiefly found in the intervals between visible retinal vessels, which suggests that they are capillary in origin. An interesting picture of capillary hæmorrhage is that in which a blood-vessel passing through a patch of hæmorrhage is accompanied by a blood-free zone—a pale band on either side of the blood column. This blood-free zone closely corresponds to the capillary-free zone found on either side of the retinal arteries.[3]

It is common knowledge that striate, flame-shaped, or brush-like hæmorrhages take on this form because they are situated in the nerve-fibre layer of the retina, and the blood naturally tracks between the fibres which are here lying parallel to the surface. Such hæmorrhages come from the arterial side of the capillary system, and are often seen in hypertension. Hæmorrhages from the venous side of the capillary system are usually found in the deeper retinal layers, because the efferent veins of the retina are derived from the deepest capillary plexus. They are especially common in the outer molecular layer, where owing to the direction of the fibres the tissues tend to split in a vertical direction, allowing the hæmorrhage, as seen with the ophthalmoscope, to assume a punctate or petechial form. Hæmorrhages of the kind are well seen in diabetic retinopathy.

1. *Science*, 1942, **96**, 558.
2. Ballantyne, A. J. *Irish J. med. Sci.* October, 1943, p. 551.
3. Michaelson, I. C. and Campbell, A. C. P. *Trans. ophthal. Soc. U.K.* 1940, **60**, 71.

AGRICULTURE AND MILK

AFTER the war this country will again import large amounts of grain, sugar and other products more cheaply grown abroad; but if we are to raise the standard of nutrition British agriculture will have to provide more of the so-called protective foods—fruit, vegetables, eggs, and especially milk and dairy products. It does not follow that corn-growing and the traditional feeding for beef will fall below prewar levels; they may be higher. Each occupies an interdependent place in a system of mixed farming without which soil fertility cannot be maintained.

The war-time ploughing of millions of acres of permanent grass, much of very low quality, has produced arable crops; but there are already indications that it may easily lead to soil exhaustion which is being accelerated by the decrease in the number of livestock. Stapledon and Davies [1] nevertheless believe that it can do infinite good if we think in terms of sensible rotations and regrass as we go. Last year—and even more this year—there have been protests against the Ministry of Agriculture's policy of a larger and larger corn acreage, particularly in areas unsuited to corn production. Stapledon and Davies claim that the temporary ley (lea or sown pasture) will yield more animal food than the best permanent grass or any cereal, and will on the lowest estimate be equal to that of roots or kale. Even when these yields are transcribed into units of human food the temporary ley still compares favourably with most arable crops. Ley farming renders milk and corn production complementary, and it would cheapen milk production and make it less dependent on imported food-supplies. Some of the claims made for it may be disputed, but there can be no doubt that the policy of "taking the plough round the farm" is gaining in popularity.

If farmers have reasonable financial security and good technical advice they will no doubt respond to the nutritional needs of the nation, but the difficulties of their tasks and the inducement required should not be underestimated. At a discussion on milk held by the Nutrition Society some time ago Mr. J. L. Davies defined the three primary requirements of the milk industry as (1) a ten-year plan involving expenditure of £100 million on capital equipment urgently needed; (2) a large measure of control over the diseases of dairy cattle; and (3) an adequate supply of good labour for which a six-day week would be necessary. The risks from disease are greater in dairy-farming than in any other branch of livestock farming, and the control of tuberculosis and brucellosis, or even the production of clean milk, requires a degree of supervision unnecessary in other branches. Before the war milk production accounted for over a quarter of the total agricultural output, and milk was twice as important as any other single commodity; but if arable farming and livestock feeding are profitable over an extended period it is possible that fewer and fewer farmers will be interested in milk; as one of them said before the war, "If corn and beef production ever pay again I will gladly go into my dairy and smash every bottle in the place." The same applies to the men who milk the cows, either by machine or hand; there are

1. Stapledon, Sir G. and Davies, W. Ley Farming. Penguin Special, No. 99, 1942.

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many who have worked a seven-day week for 52 weeks in the year for many years. Under these conditions standards of cleanliness tend to be low, and it is becoming harder to obtain cowmen—they would rather drive a tractor, work horses, or tend stock which at least do not need milking twice or three times every day.

It is clear that the production of milk of high quality requires increased expenditure of money and effort, and a high standard of labour, all of which imply an increase in the price of milk. On the other hand if the optimum amount of milk is to be drunk the price must be lowered rather than raised. Control of disease, improved management, and particularly increased efficiency in distribution, may keep down the price. But it is not unlikely that the subsidising of milk for priority consumers will have to continue.

CANCER

"One of the most hopeful features of the campaign against cancer is the fact that, in recent times, every year has made its special contribution to the sum of knowledge. When added together the contributions of the last ten years or so constitute a body of discovery so substantial as to justify the belief that the campaign is entering upon a new phase."

With this introduction the report rendered at the annual general meeting of the British Empire Cancer Campaign in Dec. 14 strikes an encouraging note. Three observations are picked out for special mention. One is the finding at the Royal Cancer Hospital that certain diets inhibit cancer of the mamma and cancer of the liver in mice. The second is statistical: an analysis of about 1000 cases of primary carcinoma of the lung reveals that the disease is four times as common in males as in females and that engineers, mechanics, and painters and decorators have a high incidence while clerks have a low one. Thirdly comes the confirmation of American statements that diethyl stilbœstrol inhibits the growth of prostatic cancer. This potent œstrogen, now widely used in clinical medicine, is an artificial substance synthesised by E. C. Dodds and his associates in 1938. It has been employed in cancer of the prostate by various surgeons in the United States and Canada in the hope that the secretory activity of prostatic metastases, like that of normal prostate, would be inhibited by the œstrogen. The cases mentioned in the present report are few. At the Middlesex Hospital one patient has been studied carefully for a year; at the Royal Cancer Hospital 2 patients seemed to derive no benefit either locally or generally, but in 5 others, which showed secondary deposits in bone, administration of stilbœstrol by mouth relieved the pain from these metastases, lowered the acid phosphatase level in the serum and also produced some degree of regression in the primary growth. This method of treatment is important in itself, for in England and Wales alone, Professor Dodds told the meeting, 4000 men die every year from prostatic cancer. But the chief significance of the work may lie in the fact that it is, in the words of the report, "possibly the first practical application of chemotherapy in the treatment of cancer." Stilbœstrol is a substance with many chemical affinities, and we may be sure they will be further explored.

THE HEART IN PREGNANCY

THE increasing care with which antenatal supervision is being carried out lends enhanced importance to the question of what constitutes a "normal" heart during pregnancy. The X-ray and electrocardiographic changes recorded in apparently healthy pregnant women have led to considerable controversy as to whether these indicate actual enlargement of the heart or merely an alteration in its position. In an attempt to clarify the issue, Hollander and Crawford[1] have carried out a routine examination in an unselected series of patients without any history, symptoms, or signs of heart disease who were first seen during the first 3 months of pregnancy. Anteroposterior and left and right oblique X rays of the heart were taken every 3 months during pregnancy and again 1 and 2 months after parturition; in addition electrocardiograms, using the two-string electrocardiograph thus obtaining simultaneous records of leads I and III, were taken every 4 weeks. As a result of rigorously excluding all patients who did not stay the course, their final observations are based on only 18 cases, but apparently the incomplete data in the other cases agreed with the findings in the fully investigated cases. The outstanding electrodardiographic changes were confined to lead III and consisted of a prominent, and even deep, Q wave and inversion of T, changes which occurred either together or separately. There was also a tendency for the electric axis deviation to show a shift to the left during the first 6 months of pregnancy and then swing to the right, the angle of axis deviation sometimes being as great as 28°, though it was usually nearer 15°. The important X-ray observation was the backward displacement of the œsophagus by the posterior surface of the heart, seen in 10 cases. Other changes noted were straightening of the left border of the cardiac shadow, prominence of the pulmonary conus, and an increase in the transverse diameter of the heart. The interpretation of these findings seems to be straightforward. The electrocardiographic changes are due to a shift of the heart to the left as a result of the raising of the diaphragm and rotation of the heart in the long axis. Cohn and Raisbeck[2] found similar large Q waves in lead III with rotating leads taken directly from the chest, and Thomson, Cohen and Hamilton[3] noted that the alterations in the Q and T waves were greater when the height of the diaphragm most affected the position of the heart. A strong argument against their being due to cardiac hypertrophy is that in Hollander and Crawford's experience the changes often disappeared towards the end of pregnancy. The radiological changes also can be explained on the basis of alteration in the position of the heart as a result of the raised diaphragm, but another factor probably comes into play here—the increased blood-volume which occurs during pregnancy and is accompanied by increased cardiac output. This attains its maximum at the 9th lunar month of pregnancy and then decreases steadily during the 10th month until by the 2nd month of the puerperium it has returned to normal.[4] Hollander and Crawford found that the indentation of the barium-filled œsophagus, present in the earlier stages of pregnancy, had practically disappeared by the 34th week of pregnancy. Their suggestion therefore seems valid, that this indentation is due to enlargement of the left auricle as a result of the increased volume of blood to be accommodated in the heart. These observations should facilitate the accurate diagnosis of early cardiac lesions during pregnancy and the puerperium.

The ARMY COUNCIL has decided that serving medical officers may participate in organised discussions, and express opinion, both individually and collectively, on the Government's forthcoming proposals for reorganisation of the civilian health services. Provided the discussions are held in off-duty hours, and Service channels of communication are not used to promote meetings or transmit opinions, there is "not only no objection to but every justification for such discussions being held."

1. Hollander, A. G. and Crawford, J. H. *Amer. Heart J.* 1943, 26, 364.
2. Cohn, A. E. and Raisbeck, M. J. *Heart*, 1922, 9, 311.
3. Thomson, K. J., Cohen, M. E. and Hamilton, B. E. *Amer. J. med. Sci.* 1938, 196, 819.
4. Thomson, K. J., Hirsheimer, A., Gibson, J. G. jun. and Evans, W. A. jun. *Amer. J. Obstet. Gynec.* 1938, 36, 48.

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Special Articles

SEX RATIO DURING WAR

W. J. MARTIN, PH D LOND

MEMBER OF THE MEDICAL RESEARCH COUNCIL'S STATISTICAL STAFF, LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE

ONE of the best known features of vital statistics is the excess of male over female births. This phenomenon, as far as can be judged, has been permanent and common to mankind in general, though variations in the average size of the ratio occur in different periods and between various races. Tschuprow,[1] in a paper discussing the fall in the size of the sex ratio in many European countries, including England and Wales, during the last half of the 19th century and the first decade of the 20th, propounded the hypothesis that the size of the sex ratio was negatively correlated with the number of miscarriages and stillbirths. The male prenatal mortality was very much larger than the female but sufficient data were not available to establish that variations in the size of the sex ratio were mainly due to these factors.

It is well known that the ratio is susceptible to large social disturbances and in the years immediately after the war of 1914–18 there was a considerable rise in the sex ratio of all the belligerent countries. No completely satisfactory reasons for this rise have been advanced. In England and Wales the sex ratio, which had varied between 1032 and 1049 during the 60 years 1859–1918, rose in 1919 to 1060 and remained above the prewar level during the next two years with values of 1052 and 1051. A high sex ratio has also been recorded during the present war; the ratios, 1939–42, were 1050, 1058, 1054 and 1061. The last value is the highest ever recorded since the introduction of registration in 1838.

The war periods have also, in common, a very high marriage rate, the highest rates per 1000 of the population ever recorded being during these periods. The marriage rates during 1914–21 were 15·9, 19·4, 14·9, 13·8, 15·3, 19·8, 20·2, 16·9, and for 1938–42 they were 17·6, 21·2, 22·7, 18·7, 17·8. The mean marriage rate for the 102 years 1838–1939 was 16·1, and the only years when the rate exceeded 17·9 were during these two war periods. No correlation has been established between the large increase in the marriage rate and the sex ratio during 1919–20 owing to lack of data. Age of parents was not given in the birth certificate and the relationship between sex ratio and parental age had to be inferred from data relating to very small communities, or in more recent years from the data relating to the registration area of America where the ages of parents were included in the particulars of birth registration. Russell[2] found from an examination of American births that the sex ratio was not related to age of mother but that a slight association existed with the age of father. His values were :—

SEX RATIO OF BIRTHS AT VARIOUS PARENTAL AGES

Parent	15–20	20–25	25–30	30–35	35–40	40–45
Mother ..	1059	1059	1059	1052	1058	1052
Father ..	1065	1063	1059	1058	1053	1050

It is now possible, with the tabulation of the first fertility statistics of England and Wales relating to 1939, to make a direct approach to the problem. The births were tabulated by age of mother but not by age of father, and the sex ratios were :—

Under 20	*20–25*	*25–30*	*30–35*	*35–40*	*40–45*	*45–50*
1062 ..	1063 ..	1047 ..	1053 ..	1034 ..	1025 ..	962

The values exhibit a steep decline with increasing age, although the continuity is broken at ages 30–34, and are in marked contrast with the American ratios. The difference between the trends of the two countries may be due to the different distribution of births: in America the family is larger and the mother's age is lower than in England and Wales. The first births formed 36% of all American births in 1936, and 42% of the legitimate births in England and Wales during 1939; 70% of the American first births were born to mothers aged less than 25 years, while only 42% of the English first births were born to mothers in this age-group. Despite this large difference, first births in England and Wales formed 67% of all births to mothers at ages under 25, while in America the percentage was only 57. It cannot be determined whether the above trend in England and Wales is typical of the average experience or not, since statistics for the years subsequent to 1939 are not yet available, but it seems probable in view of the large number of births involved—over 600,000—that the sex ratio will be found to have a similar trend. Russell found from 6,000,000 American births that the sex ratio declined with order of birth until the fifth birth, when it tended to a constant value; the ratios were 1061, 1060, 1058, 1055, 1051. The same trend was shown in France[3]; the sex ratios based on nearly half a million births were 1075, 1037, 1051, 1039, 1035 and only 1022 for the sixth rank and over. No data are available to determine whether age of mother is a factor in the size of the ratio within the rank of birth, but that it is probably so may be indirectly inferred from the French data. The sex ratio of the first births declined with increasing age of father; for the age-groups under 25, 25–34 and 35–49 it was 1081, 1074, 1059. This relation possibly holds for age of mother, since there is a fairly high correlation between age of husband and wife. On these assumptions the high sex ratio during the war periods can be explained in part if not wholly, since a very high marriage rate prevailed in both periods and a sustained increase in the number who marry means a lower average age at marriage. The average age of mother at maternity would decrease and the proportion of births to young mothers would increase, 35% of the first maternities during 1939 occurred within one year of marriage and 61% within two years, with a consequent rising of the sex ratio.

1. Tschuprow, Al. A. *Bull. Inst. int. Statist.* 1915, **20**, 378.
2. Russell, W. T. *J. Hyg., Camb.* 1936, **36**, 381.

MATERNITY SERVICES IN LONDON

A SURVEY WITH RECOMMENDATIONS

A VALUABLE report has just been issued [4] on behalf of the voluntary hospitals and district nursing associations undertaking maternity work in the Greater London area; it gives a careful survey of existing facilities for maternity work in London, and makes recommendations for improving them.

HOSPITAL ACCOMMODATION

A maternity service, it is held, should be local in character, and while beds in central London are sufficient, provided they are adjusted to ensure adequate teaching of medical students, additional beds are needed towards the boundary of the LCC area and in Outer London. There is room for both maternity hospitals and maternity departments at general hospitals. A maternity hospital should have a minimum of 100 beds, and a unit in a general hospital a minimum of 50 beds; where population warrants it, larger units should act as Key-hospitals for the area. In Outer London a number of appropriately distributed small units should work in close association with key hospitals, which would reserve beds for emergencies and complicated cases. Mothers who had previously had abnormal pregnancies, primiparas, and those with unsuitable home conditions should have first claim on these beds.

All maternity hospitals should have their own pharmacies, X-ray and pathology departments, and should offer adequate facilities for research.

The numbers of private beds in maternity and general hospitals should be increased.

3. Statistique générale de la France, statistique des familles en 1906. Paris, 1912.
4. The London Maternity Services Joint Committee which has drawn up this report came into being some years ago to link up the maternity work of voluntary hospitals and district nursing associations within the Metropolitan Police District. The committee has 26 members, half of them medical, under the chairmanship of Mr. James Paterson (City Maternity), with Mr. A. G. L. Ives, secretary. The report has been drafted by a subcommittee of 8, of which Dr. H. K. Waller and Mr. J. M. Wyatt, FRCOG, are members, with Prof. T. B. Johnston, MD, as chairman. It is being circulated with the support of King Edward's Hospital Fund for London and the concurrence of the British Hospitals Association as a basis for discussion with the Ministry of Health and the municipal bodies concerned. The committee's address is 10, Old Jewry, E.C.2.

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At least one additional isolation unit, to be situated in South or South-east London, is needed; and every unit should have isolation beds for suspect cases. Cases of abortion should be under the care of a gynæcologist. All maternity units should plan accommodation so as to be able to admit any of their own booked cases which abort; other cases should be fairly distributed between the gynæcological units of voluntary and municipal hospitals.

There should be close liaison between voluntary hospitals and local authorities in planning new accommodation, so as to avoid overlapping.

TRAINING OF DOCTORS AND MIDWIVES

The Royal College of Obstetricians and Gynæcologists consider that medical students should take their midwifery courses at their own medical schools, which means that each teaching hospital should have a maternity unit of about 80 beds. Until necessary building can be completed existing arrangements with LCC hospitals should continue. Provided cases are carefully apportioned there is no reason why the same institution should not undertake the training of both medical students and pupil midwives.

If there is a shortage of domiciliary cases, existing districts at present not recognised for training should be combined into units large enough to conform with requirements. Postgraduate courses for doctors and midwives should be greatly extended at maternity hospitals and general hospitals with maternity units.

ANTENATAL CLINICS

Where a hospital accepts patients from the clinics of a local authority, the expectant mother should be sent to the hospital antenatal clinic for her first general examination, not later than the 32nd week of pregnancy.

The medical officer in charge of the municipal antenatal clinic should have held a resident appointment in a maternity hospital. Arrangements should be made so that the practitioner called to a midwife's case in an emergency shall have seen the patient beforehand and examined her at the 32nd and 36th week. Antenatal clinics should be closely linked with the nearest maternity unit so that special examinations or consultations can be arranged. Health visitor and midwife should coöperate and agree in the advice they give the patient. Dental clinics should be provided in connexion with all antenatal clinics.

DOMICILIARY MIDWIFERY

A patient choosing to be delivered at home by the district service of a voluntary hospital must understand that in need the midwife will call in one of the hospital obstetrical staff. In other cases there should be a rota of doctors who can be called in; they should have examined any of the midwife's cases for which they have taken responsibility.

A home-help service should be available, and resident nurseries for young children of a woman during confinement. Mobile obstetric teams should be available to small maternity units and for the patient delivered at home.

POSTNATAL CARE

Care of the newborn has not kept pace with advance in other aspects of obstetrics. Prof. Chas. McNeil of Edinburgh was called in to discuss the task of providing better safeguards for the baby in the early weeks of life.

Maternity units should appoint a pædiatrician to work in close association with the obstetric staff. Maternity units should be more generously staffed with nurses. Health visitors should see the mother a day or two before she is due to leave the maternity ward, or at home before the midwife ceases to attend.

The pædiatric staff of the maternity unit should, through the MOH, take some share in the organisation and clinical work of welfare centres, and breast-feeding clinics should be held daily. Postnatal clinics should review the mother's health during lactation. Postnatal and child welfare clinics should be held at the same time and place.

Convalescent homes should be provided for mothers who need extra rest, and should have a toddlers' wing.

A SINGLE UNIFIED SERVICE

Continuity of care and responsibility cannot, it is concluded, be achieved under divided control. An area Maternity and Child Welfare Board for Greater London should be appointed by the Minister of Health, with representation of voluntary hospitals, consultants, general practitioners, county and borough councils (including the MOH's) and other welfare authorities, district nursing associations, health visitors and midwives. There should be a small executive of leisured people, with professional and technical advisory panels. A central bureau for collecting daily information about vacant beds might be its first concern. It is hoped that the scheme will be fitted into the coördinated hospital services which are now the immediate concern of King Edward's Fund and the Voluntary Hospitals Committee.

THE EDUCATION BILL

THE far-reaching measures foreshadowed in the Government's white-paper *Educational Reconstruction* in July are embodied in the new Education Bill, published on Dec. 16 (HMSO, pp. 98, 1*s.* 6*d.* Explanatory memo. Cmd. 6492, pp. 14, 3*d.*). The bill gives the President of the Board of Education full ministerial powers, though he will retain his present title, establishes two central advisory councils for education, one for England, the other for Wales and Monmouthshire, provides for the raising of the school-leaving age to 15 on April 1, 1945, and to 16 as soon as the minister sees fit, and makes part-time education, equivalent to one day a week, compulsory for young people up to the age of 18.

The white-paper promised substantial modifications in the provisions for blind, deaf and otherwise handicapped children made in the Education Act of 1921. The new bill extends the duty of ascertainment, now confined to defectives and epileptics, to all children needing special education, including maladjusted children. An important change is that certification is no longer required before a physically or mentally defective child can receive suitable instruction; no child will be certified as mentally defective while he remains within the education system. Local education authorities will be obliged to provide special education for the less seriously handicapped children in the ordinary schools and for the more seriously handicapped in special schools. The age for compulsory attendance at such special schools will be lowered from 7 to 5 years, and parents of a child over 2 years will have the right to ask for their child to be medically examined with a view to special education. Much of the special educational treatment for handicapped children is now supplied by voluntary bodies, and the bill will enable local authorities or the minister to assist these bodies financially.

The bill imposes on local authorities the duty of providing not only for medical inspection as at present, but also for treatment of all pupils at maintained schools and young people's colleges, free of cost. It also makes it a duty of local authorities to provide meals and milk in their schools, and gives them powers to supply boots and clothes for needy children. Independent and direct-grant schools may be included in the arrangements for medical inspection and treatment, as well as school meals and milk, but the expense to the local authority must not be greater than would have been incurred at a maintained school.

The raising of the school-leaving age necessitates changes in the law relating to employment, for the existing acts only refer to the employment of children under 14. The bill empowers local authorities to prohibit or restrict the employment of any child attending a county, auxiliary or special school if it would prejudice his health or education, so that the restrictions of the Education Act of 1921 can be fitted to the new leaving age. As regards limitation of hours of employment, overtime payments and so on, the time spent at a young people's college will count as in working hours.

Dr. DONALD CAMERON, professor of neurology and psychiatry at the Albany Medical College, NY, has been appointed to the chair of psychiatry at McGill University and psychiatrist in chief to the Royal Victoria Hospital, Montreal. Dr. Cameron graduated in medicine from the University of Glasgow in 1924.

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In England Now

A Running Commentary by Peripatetic Correspondents

THERE was an old song whose chorus began, "At six o'clock on a shining morn we start our little day"; our newest nursing probationer remembered it when she arrived breathless and breakfastless on Ward X at 0746 hours—precisely a minute late. Excuses? Well, her billet is half a mile from the hospital, she has a cold little room at the top of the house, and unless she wakes herself up early, it's just too bad. Breakfast at the hospital is at 7 o'clock—all the nurses take all their meals in the hospital—and at this time of the year it isn't light until 8.30. This little personal problem appeared to be easily soluble when she saw an array of cheap alarm clocks in a local shop, and on her first off-duty spell she went in to buy one. But alas she had to confess that she was not a factory worker and came out empty handed. She went to Matron, who gave her a chit to say that she was a hospital nurse, lived in a billet and had to be at the hospital at 0700. Even this didn't help; the clocks were for factory workers starting work before 0500. Was the shopkeeper right? Or perhaps nurses are not really essential war workers until they are state registered or perhaps the various Government departments concerned haven't thought of this one. It's a very small one, but these little things count, even in war-time. The days of the "knocker-up" have passed; more's the pity.

* * *

An English-speaking Basuto was recently admitted as a mental patient "NYD." When questioned as to the cause of his rather alarming behaviour he said he had been in the habit of sending his pay home to his wife until he heard that she was no longer faithful to him, when he ceased to do so. A few months later he received a letter on behalf of his mother-in-law telling him that she was very angry with him, and had consulted a witch doctor who had "thrown the bones against him"—the acme of local witchcraft, apparently. As he is a Christian he affected not to be disturbed by this, until a few days later when he received a further letter containing a few apparently meaningless scribbles, which he felt sure was a spell from the witch doctor himself. The immediate physical effect of seeing this was an acute pain in his chest and an irresistible impulse, which he gratified, to run to his major's quarters and fire his rifle several times. This done he sank into a condition of apathy from which it was difficult to rouse him. No ordinary treatment seemed to influence his progress so I consulted the CO of the attached Basuto wing as to the possibility of finding a witch doctor among the various dock pioneer companies who could reverse the spell. He agreed to try, and rather to my surprise wrote an official request to the area commandant that a witch doctor should be available on the following Saturday. A reply was received from one of the companies as follows—

Subject: Voodoo.

Ref. your memo undated I regret that no witch doctor is at present available in this Group. They are now in short supply—the classes now called up are not so standard—and the only specialist of this subject available has regrettably left his bones behind, without which he cannot fully exercise his art.

(Signed) X Y, Lieut.-Colonel.

A matter-of-fact reply agreeing to do as he wished was, however, shortly received from another company through the usual official channels, and I was duly rung up to attend the ceremony. The medical specialist walked over with me, and we found the "doctor" with twelve husky negroes squatting in the centre of the small hospital parade ground awaiting us, to the intense interest of the native staff and patients. There was nothing particularly impressive about him—unless it was his girth—and he got up and gave us a moderately smart salute, calling his band to attention, which seemed slightly incongruous behaviour in one possessed of such occult powers. It was disappointing that he had not turned up in paint and feathers heralded by tom-toms. We went over to an empty tent which he agreed was suitable, and through the native medical corporal he was told that we wished him to drive the hoodoo out of the patient who was sitting in front of him. His attendants then surrounded them, and he looked at his victim for some time, in a rather dissatisfied way quite silently. Then he produced a small orange-coloured bag from his pocket, and slowly took out a Gold-Flake carton containing some white powder, and part of a dried goat's ear. He placed some of the former in each of the patient's nostrils, and we watched the patient in rather tense silence for another 10 minutes. At the end of this he announced through the interpreter that this was the wrong sort of spirit—he was used to those of Bechuanaland, and not those of Basutoland. We asked him whether if he could return another day with a stronger medicine it would be of use, and to please us he agreed to return next day. The CO next appeared with a case of hysterical paralysis of the arm in a young Zulu, and the long period of inspection, with nasal insufflation, was repeated. The witch doctor then said he thought this was a white medicine disease, and not for black medicine. We disagreed, and said that we were sure that he could cure it. He then searched the little bag again, and this time produced a Gillette razor-blade and scarified the affected arm on the back of the wrist, over the external condyle of the humerus, and at the insertion of the deltoid. A red powder was then rubbed in, and the patient was again watched intently. Once more, however, nothing happened, and the patient returned to his ward in triumph. I think paint and feathers would have done the trick.

The job of the twelve attendants, who took no apparent part in the proceedings, is to give a great shout at the first appearance of the offending spirit so that in its fright it will leave the victim. For the second session he turned up without them, which seemed to indicate a defeatist attitude, and this was justified by the uneventful séance. But his powder did succeed on this occasion in making the patient sneeze a good deal, which the doctor said was a very good sign.

As we walked back we wondered whether we are "covering" an unqualified practitioner, or whether the GMC will take the view that witch doctors are "medical auxiliaries." Anyway it has varied the therapeutic monotony of our lives.

* * *

Foreigners are always welcome at No. 1, Wimpole Street, but they rarely outnumber the English. At the first meeting of the European Association of Clinical Pathologists the British were only in a small minority. About ten different languages could have been heard but only English was spoken, and a good English too. The only exception was at the dinner, when a French member insisted, as was his right, on speaking his own language; for many of us it was a joy to hear again such musical words. The meeting was for the dual purpose of scientific discussion and social intercourse, and we all came away with one regret—that the chairman had been bound to work away with his green, amber and red lights to keep the speakers within their short time limit. The dinner the night before had gone off very well; a convivial and friendly atmosphere had been soon established. This was only to be expected from people who have formed themselves into an association whose main aim is to further a spirit of amity and coöperation between the medical communities of Europe. Such gatherings should make more people appreciate how pleasant it is to be a good European.

* * *

Outside the windows of the treatment-room of our young and keen psychotherapist runs a narrow passage where passing patients and nurses used to chat and joke and laugh, thus disturbing the ceremonial progress of free association. After he had convinced the chief that something had to be done, things became quiet for a few days; until one morning when chatter and noises seemed unending. He angrily dashed to the window, but retired quickly when he saw the workmen in lively discussion where and how they should fix the notice: "Silence. Treatment in progress."

* * *

In one of the semi-official social surveys, the examined people had to fill in a questionnaire headed by the words age and sex. The lady social worker was somewhat embarrassed when she saw a young labourer writing under sex: "Sometimes."

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Letters to the Editor

INFANTILE D AND V

SIR,—During the spring and summer of this year, when diarrhœa and vomiting in infants was prevalent, we had the opportunity of observing and treating a consecutive series of cases in a London isolation hospital, and our experiences may be of interest in view of your leading article of Dec. 18.

This series of 120 cases, all under 15 months of age, fell into two groups. In the first group of 61 cases (24 dehydrated) treated between April and mid-August inclusive, there were 8 deaths, giving a case-mortality of 13·1%, or 33·3% in the dehydrated cases. In mid-August the routine of treatment was altered by the early addition of human serum to the intravenous drip. In the second group of 59 cases (27 dehydrated) treated between mid-August and November inclusive, there were no deaths; there was also a striking reduction in the length of stay of these infants in hospital. The main points to be observed are:

1. Detailed examination on admission, including an accurate history.
2. Early recognition and treatment of dehydration.
3. Search for, and early treatment of, infective foci.
4. Nursing in a cubicle or by strict bed-isolation technique.

On admission, all infants are given ½-strength Hartmann's (Ringer-lactate) solution by mouth for 12–24 hours, depending on the amount of vomiting. Vomiting usually ceases within 24 hours, after which the infants are put on a dilute feed, beginning with a 1 : 8 mixture of the milk preparation in Ringer-lactate. We have made it a practice to give the infant the kind of food which he had before admission, unless there is some definite contra-indication. The feeds are gradually increased in strength until the infant is on a full-strength milk diet, usually in 5–7 days.

If dehydration is present, fluid is given intravenously without delay, using a Bateman's needle which is tied into an arm or leg vein after cutting down. At first, ½-strength Hartmann's solution is given, with or without the addition of 5% glucose, and the fluid is allowed to drip rapidly (about 30 drops per min.) for the first half-bottle (300 c.cm.). Pooled human serum is then added to the Hartmann's in equal parts (so as to obtain a half-strength dilution) and the rate of flow slowed to 8–15 drops a minute. As a rough guide it may be said that infants under 3 months require a slow flow of 8–10 drops per min., while older children will tolerate a flow of 12–15 drops per min. But in practice it is necessary to judge each case individually. The rate of flow, and the total quantity of fluid given, needs to be adjusted according to the weight of the baby, the degree of dehydration, the degree of pyrexia if any, and the amount of fluid which the infant is able to take by mouth and retain. The drip is continued, giving alternate bottles of Hartmann's plus serum and ½-strength Hartmann's, until dehydration is completely corrected, the stools are less profuse, and the infant is able to tolerate a dilute feed. This is generally in 1–3 days. If vomiting persists, all feeds by mouth are stopped for at least 12 hours and the amount of parenteral fluid is increased. Feeding is then recommenced with ½-strength Hartmann's as previously described.

If the infant is very collapsed on admission, as may happen with a severely dehydrated baby who has had several hours of waiting in an outpatient department followed by an ambulance journey, treatment is instituted exactly as for "surgical shock." Warmth, stimulants such as brandy and nikethamide and oxygen are given, and the infusion is begun immediately. For this purpose, a cutting-down set is always kept ready sterilised. We cannot stress too highly the urgency of treatment in such cases.

This routine and the choice of transfusion fluids are based on the following clinical observations.

1. Most infants with D and V respond well to a preliminary period of starvation, provided it is not too long and that sufficient fluids are given.

2. When dehydration is present, it is essential to deal with it early, since long-continued dehydration may cause irreversible damage, and the chances of recovery appear to be in inverse proportion to the duration of dehydration. We should point out that with older and fatter babies, in whom the classical signs of fluid-loss are less apparent, there is no wrinkling of the skin, but the dehydration with loss of tone and elasticity becomes obvious if a larger fold of skin (which includes the subcutaneous fat) is pulled up between the fingers. It has also been our experience that profuse watery diarrhœa is a more important factor than vomiting in producing dehydration.

3. When dehydration is severe or of long standing the situation is urgent, since there is almost certainly loss of plasma-proteins and the condition is akin to surgical shock. All workers are familiar with the type of dehydrated infant who at first responds well to a transfusion of saline or Hartmann's, and then develops œdema in spite of the fact that he is still dehydrated. Assuming this to be due to lowered plasma-proteins it would seem reasonable to give the infant extra proteins as soon as possible. In practice, it is simpler to use a ½-strength solution of human serum or plasma, as this obviates the technical difficulty of getting the rather sticky full-strength fluid to run through a slow drip, and also avoids the danger of approaching the unknown point at which tissue œdema begins although dehydration is not yet corrected. Because there is often difficulty in getting the drip to start, especially if the infant is very collapsed, it is advisable to begin with the half-bottle of Hartmann's.

It is necesary to pay very close attention to the infant during intravenous therapy; at the earliest sign of œdema—puffiness of the hands and feet, eyes, scrotum or vulva—the fluid must be discontinued immediately. There is certainly danger of "drowning" an infant with too much parenteral fluid, but with careful watching this can be avoided, and it is still a far smaller risk than allowing an infant to remain dehydrated for a long period.

It need hardly be said that it is essential to look for and treat any focus of infection. Sulphonamides, especially sulphadiazine, were found to be of great value when given early and in adequate dosage. Special attention must also be paid to the ears, and myringotomy, and if necessary mastoidectomy, must be performed early.

A prerequisite for success with this simple routine is a conscientious and coöperative nursing staff; without the hard work and intelligent collaboration of the sisters and nurses of the barrier-wards in which these infants were nursed, these results could not have been obtained.

Our thanks are due to Dr. W. Gunn, the medical superintendent, and to Dr. Robert Cruickshank of the North-Western Group Laboratory for their advice and encouragement.

M. B. ALEXANDER.
Y. EISER.
North-Western Hospital, LCC.

WORK FOR THE DISABLED

SIR,—The Disabled Persons (Employment) Bill marks three important developments in the formulation of policy on rehabilitation. It defines a "disabled person" as one "who on account of injury, disease or congenital deformity is substantially handicapped in obtaining or keeping employment or in undertaking work on his own account, of a kind which apart from that injury, disease or deformity would be suited to his age, experience and qualifications"—a definition which can be compared with that of the Danish Invalidity Law which adopted as its standard inability to earn more than one-third of the wages normally earned by an ordinary individual of comparable status without disability. The bill makes provision for the preparation of a register of disabled persons and it lays down machinery whereby employers with more than 25 workpeople may be compelled to find employment for a quota of men whose names appear on that register. And the Minister may, after consultation with employers and workers, reserve certain classes of work for the exclusive employment of registered persons. These far-reaching principles open up a new approach to the welfare of disabled persons who are now to enjoy "under adequate medical supervision and under circumstances conducive to the restoration of fitness" facilities for physical training, exercise and occupation under the direction of a National Advisory Council with a series of district advisory committees.

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Wisely used, these provisions should go some way towards the recognition of the fundamental importance of medical skill and interest in the well-being of the disabled. But it is a pity not to have brought in, besides the pooled experience of interested individuals and societies, the whole weight and authority of the government departments concerned with social medicine and education. There was a great opportunity here of doing something tangible towards the provision of a really comprehensive health service for members of the community who badly need its care, and it would be an act of statesmanship on the part of the Minister of Labour to make it clear that it is his intention to approach the rehabilitation of the disabled along the broadest possible lines. That, as your leading article last week set out so convincingly, is the essential thing. Don't label disablement, get your man fit enough to forget it. The issue cannot be tackled successfully as a purely industrial one.

ARGUS.

QUIZZING THE PHYSICIANS

SIR,—The interim report of the social and preventive medicine committee of the Royal College of Physicians of London (subject of a leader in your issue of Oct. 30) is an interesting document, apart altogether from its intrinsic value as a contribution to medical education. The synchronisation of its publication with that of the College's committee on psychological medicine throws into prominence the curiously differing constitution of the two committees. The latter, for instance, has 20 members, compared with only 13 on the former, but the most striking difference is the paucity of clinicians, and especially consultants, on the social and preventive medicine committee; there are 3 MOH's, 1 professor of public health, 1 American attached to the Ministry of Health, 1 whole-time member of the scientific staff of the MRC, 1 whole-time professor of medicine and 1 statistician. What is the significance of this? Lack of interest of the clinicians in the subject seems the obvious reply, though perhaps there is some more subtle explanation. However that may be, perhaps the paucity accounts for certain features of the report.

As a clinician I resent the statement that "Social medicine represents a relatively novel point of view," especially when at a later stage the committee define the main purpose of the curriculum in preventive medicine as being "to lead the student to the study of man in his environment—of the person or patient in relation to his family, industrial and social background." What on earth have some of us been teaching for years to our students except this very thing? What would have been left of our teaching if we had had to omit all reference to the influence of working and home conditions on the patient with a peptic ulcer, or of housing on the rheumatic child?

In the proposed curriculum there are several curious suggestions, presumably arising out of the attempt to be intensely practical, but resulting in a rather unbalanced programme. Climatology may not be of immediate importance to the student, but it is certainly a subject he should know something about. Similarly the rather scathing comments on genetics are more than surprising these days, and I can conceive of no part of the curriculum in which instruction in this vital subject could be more satisfactorily included than social medicine. Equally surprising is the suggestion that such important subjects as ventilation, sanitation, &c. should be more or less ignored.

I must confess also to disappointment at the lack of style in the language of the report. Perhaps we have been spoiled by the magnificent language of the Beveridge and the Scott reports, but one would have thought that an institution with the traditions of the RCP would have picked up at least an echo of the resounding phrases which some of the fellows of old used.

The psychological medicine report says: "this teaching must be limited . . . it must be solid, because the student is too raw to be able to profit by debatable speculations about human nature." And yet we consider ourselves a well-educated profession! What about these same students' contemporaries in other faculties studying, and understanding and discussing, the intricacies of philosophy, logic and mathematics? Are they too raw to profit by "debatable speculations about human nature?" Must they be forbidden Plato, Socrates, Hume, Berkeley and Kant, and confined to potted versions of the originals served up by their tutors? Or are we to take this as the official opinion of the College on the intellectual standards of our students?

Finally I must pick a bone with the committee in their delineation of the qualifications of a professor of social and preventive medicine. "A brief clinical experience" is sufficient, but he must have "formal training in public health," "experience in public health work" and "familiarity with practical public health activities," and, while "interest and training in research are highly desirable, . . . it is considered immaterial whether this training be in epidemiology, bacteriology, nutrition, child health, social science, or in a field like tropical medicine." Not a word about clinical science. Many of these desiderata are admirable, but, at least in these days of transition, a sound clinical training both in research, practice and teaching is surely the first essential of such a professor. Unless he has such a background he will never be able to teach "medicine" of any description, he will never adequately appreciate the problems of individual patients and their reactions to their environment, and, perhaps as important as anything at this stage, he will never earn the coöperation of his colleagues, the clinicians. The details of public health administration can be acquired with relative ease, the work of voluntary organisations is already known to the experienced clinician, and his training is such that he could very easily assimilate these subjects and knit them into a single whole. The public health administrator, however, will seldom attain this ideal because the vital aspects cannot be learned from the books, but only as a result of long and often bitter training in the hard school of clinical medicine.

BEDSIDE TEACHER.

THE GOVERNMENT AND THE PROFESSION

SIR,—The letter in your issue of Nov. 20 might give a wrong impression of the views of the medical practitioners of the Highlands and Islands area of Scotland. Dr. Leys, who is physician specialist for the northern counties of Scotland under the Highlands and Islands (Medical Service) Scheme, circularised several of his colleagues, general practitioners and public health officials, within the area of his appointment asking them if they would sign this letter. He did not circularise all his colleagues, myself for example, but only a selected few such as our MOH, the secretary of the local division of the BMA, the president of the Northern Counties Branch of the BMA, &c., men whose names as signatories to his letter, if they approved of it, might give it an appearance of representing the views of the area. Not a single practitioner or medical official in the counties of Caithness, Sutherland, Ross-shire, or Morayshire signed this letter, nor do we find the Orkneys, Shetlands or Hebrides represented among the signatories nor the Burgh of Inverness nor the consulting staff of our central hospital, the Royal Northern Infirmary, apart from Dr. Leys himself. The county of Inverness is represented by two general practitioners from Fort William, and four from the Island of Skye. Would it not have been a more Highland-like letter if Dr. Leys had given your readers, even as a parenthesis, a list of those colleagues who refused to sign his letter, and also, to save paper, just the number of medical practitioners and medical officials in the Highlands and Islands area whom he did not circularise? The bracketing of places of residence after the names of the signatories is likely to mislead.

We have a very fine national service in the Highlands and Islands, a service applauded by the League of Nations and by the many from the Dominions and abroad who have visited us. A meeting was recently held in Inverness open to all practitioners within the Highlands and Islands area. It was the duty of all who wished our service changed to be there and to state their views. It was one of the largest meetings of medical men and women ever held within our area, with representatives from all our northern counties. Not a single person present asked for a salaried state service under local authorities. All felt that to be dominated by local authorities would be the ruination of our service. We appointed a delegate to meet the powers that be in Edinburgh. After the Secretary of State heard Dr.

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Leach's statement, Dr. Leach was assured that the identity and character of our service would be maintained. A week ago we had a meeting of elected representatives of the Highlands and Islands subcommittee of the BMA, with representatives from Caithness, Sutherland, Ross-shire, Inverness-shire, Argyll and the Burgh of Inverness. Every person present agreed that our service should be maintained as at present, and valuable suggestions were put forward for its further improvement. This is not the opinion of medical practitioners alone; it is the opinion of the people whom we serve. We do not wish our service ruined, or even belittled by people who know nothing of our past, our sufferings, and what this service has meant in giving hope to our people, and relieving them of much of the suffering that their forbears had to go through. We have a service of which we are proud to be members in spite of our isolation.

Tain, Ross-shire. ENEAS K. MACKENZIE.

FEEDING WITH AMINO-ACIDS

SIR,—Your editorial on feeding with amino-acids (*Lancet*, 1943, i, 143) has provoked discussion, and one of the authors mentioned therein has already taken exception to your comments (*Ibid*, 1943, ii, 275). As the first one to use amino-acids in the human as a method of intravenous protein alimentation, I was struck immediately with the fact that your leader seemed to misunderstand many fundamental considerations regarding parenteral therapy and about clinical research in this country. While my first impulse was to take up these misunderstandings in turn, I would prefer to express rather my personal pleasure at the publication of this editorial because it means that this new therapeutic procedure, which was started in this country nearly 5 years ago, has already been deemed important enough to be discussed (though somewhat belittled) by our esteemed English contemporaries.

Parenteral injections have perhaps reached a wider use in this country than elsewhere, although their value in lowering surgical mortality and minimising surgical complications is recognised everywhere This is true because such injections not only correct serious biochemical deficiencies but actually meet several daily nutritional needs of patients temporarily unable to take anything by mouth or in whom the oral ingestion of fluid or food would prove deleterious. The addition of appropriate amino-acid mixtures to the four other nutritional elements now extensively used enables the surgeon to avoid many of the deleterious effects now known to follow protein deficiencies, particularly post-operative hypoproteinæmia. In fact, this new procedure is a physiological short-cut, circumventing the need for the gastro-intestinal tract so often temporarily out of commission. Plasma transfusions, true enough, may also be used to give parenteral protein nourishment and have many advantages, particularly in acute hypoproteinæmia, but are scarcely as physiological, nor as inexpensive or convenient, as an injection of an appropriate mixture of amino-acids. Amino-acid mixtures have also been given by mouth but only to spare digestion, which is so necessary if whole protein food is to be absorbed, and is occasionally impaired, for example, by pancreatic achylia and nutritional œdema of the gastro-intestinal mucosa.

School of Medicine,
Washington University, St. Louis. ROBERT ELMAN.

OXFORD VAPORISER

SIR,—I fear the brevity of my report * has persuaded Wing-Commander Soper to misread between the lines in some places. The cases dealt with were of a particular class—namely, prolonged and often repeated operations on men who had sustained recent severe wounds. I do not consider ether the *ideal* anæsthetic for these cases, although at the time it was the best available. Nitrous oxide and oxygen in a closed circuit, with cyclopropane or ether as adjuvants, would have been preferable. I tried to point out how the use of the Oxford Vaporiser minimised the disadvantages of ether, rendering them insufficient to outweigh the advantages of portability. Soper suggests premedication two hours before operation; I have found one hour most likely to bring about amnesia. Moreover a dry mouth for two hours in a hot climate is very uncomfortable, and shortage of nursing made two injections impracticable. "Unpleasant" is a relative term and I wonder if Soper's grateful patients would not have been even more grateful for an induction with 'Pentothal.' When I used a chloroform-ether mixture during induction the average amount of chloroform used was two drachms, administered on an open mask held an inch or two from the face. The small quantity of chloroform thus absorbed was sufficient to tide over the difficult transition. During the very busy period covered by my report (we might be operating 18–20 hours a day) time was of major importance, and on the occasions when I decided not to use chloroform a little CO_2 helped to speed up the induction. As to oxygen, the two best prophylactics against the toxic effects of prolonged ether (or chloroform) are, in my experience, glucose and excess oxygen.

At the end of my report I compared the Oxford vaporiser with the "tin can" vaporiser, because several anæsthetists in the Middle East had suggested that the latter was just as good. I have used the tin can when running more than one table with only one machine, and I have found that if the tube connecting the can to the patient is narrow there is too much obstruction to breathing; if, on the other hand, the tube is wide there is a dead space with accumulation of CO_2 and heavy breathing which may exhaust the patient.

M. RUSHTON.

* Captain M. Rushton's article in our issue of Oct. 23 (p. 509) was incorrectly ascribed to Mr. MARTIN A. RUSHTON, B CHIR, LDS, attached to the plastic and jaw centre at Park Prewett Hospital, Basingstoke. A correction of this regretted slip appeared on p. 572 of our issue of Nov. 6 and we take the opportunity of repeating it here.—ED. L.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

THE House has adjourned for the Christmas recess in a state of expectation. Expectation of the opening of the second front as a result of the Moscow and Teheran conferences, expectation of great legislative prospects on our reassembly, expectation of political repercussions, vague and indefinite it is true, which may come upon us during the next series of sittings.

The news of the Prime Minister's illness at this juncture is disturbing and all medical members were cross-examined on the precise nature of the pneumonia of the left lung. The House wishes Mr. Churchill very well, and hopes his robust constitution and remarkable vitality will enable him to overcome this attack rapidly and completely. But the House also hopes that the Prime Minister will take a reasonable length of convalescence before returning to full work.

Mr. Eden's statement on the war situation revealed no new facts because all that can be said of general strategy has already been said in the communiques of Moscow, Teheran and Cairo. The Teheran conference settled times, places and dispositions of military efforts by land, sea and air, and these will be communicated to the enemy in due course—on the field. The full glare of the war searchlight has been turned on the Far Eastern field of operations, and the greater concentration on China, now a major factor in strategical dispositions, involves a further drain on the world's medical resources. But China may overcome her deficiency in numbers of medical personnel by instructing her educated and highly adaptable people along the lines of medical training found effective in the British and Dominion forces during the war. China has vast armies and they must be served.

When the House reassembles in the New Year one of its first duties will be a two-day debate on the Education Bill, the text of which has just been published. It is a long document running to 97 pages, with 111 clauses and 9 schedules. Provision for the examination of pupils requiring (or likely to require) special educational treatment will show the education authorities in all areas the extent of their liabilities more fully than at present. The facilities for medical treatment of school-children will need to be extended as it becomes the duty of every

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authority to make "such arrangements for securing the provision of free medical treatment" as are necessary. The arrangements for the provision of "milk, meals and other refreshment" are not so definite, as they await the result of the discussions on the Beveridge proposals for children's allowances. In announcing interim decisions on the Beveridge report earlier in the year, the Government stated that they did not accept Sir William's figure of children's allowance because they proposed to supply milk and meals in school in place of part of the amount suggested. Clause 47 in the new bill, which deals with milk and meals, does not make this point clear and is certain to arouse controversy. It has been an article of faith with many educationists for a long time that one satisfactory meal should be provided for every child in every kind of school. Great as are the changes to be brought about by the bill they will leave the main structure of education still divided between the private schools and those paid for out of public moneys. The school-leaving age is to be raised to 15 in 1945—unless it is postponed—and the date for raising the leaving age to 16 is brought nearer than it was. All schools whether privately owned or otherwise will in future, almost certainly, be subject to inspection, and it would be an advantage to extend arrangements for periodic medical inspection and routine clinic to all schools, for in this respect private schools (including some of the celebrated "public schools") are at a disadvantage compared with the council schools.

On one of the last sittings Sir Frederick Sykes, who is chairman of the Miners Welfare Commission, gave an encouraging account of their activities. Many pit-head baths have been completed and 419,146 men (57% of the total) are now served. Canteens have helped, but the nutrition of miners will not be maintained at an adequate level unless, in some areas at least, the men get extra rations. Sir Frederick is soon to open a new rehabilitation centre at Talygarn for the South Wales, Forest of Dean, Somerset and Bristol areas, and he told the House that two centres are already in operation and five in preparation. The difficulty is to get medical officers and staff.

Infectious Disease in England and Wales

WEEK ENDED DEC. 11

Notifications.—The following cases of infectious disease were notified during the week; smallpox, 0; scarlet fever, 2564; whooping-cough, 1641; diphtheria, 634; paratyphoid, 2; typhoid, 5; measles (excluding rubella), 444; pneumonia (primary or influenzal), 2956 (last week 2301); puerperal pyrexia, 162; cerebrospinal fever, 77; poliomyelitis, 11; polio-encephalitis, 0; encephalitis lethargica, 1; dysentery, 166; ophthalmia neonatorum, 66. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Dec. 8 was 1925. During the previous week the following cases were admitted: scarlet fever, 142; diphtheria, 30; measles, 18; whooping-cough, 52.

Deaths.—In 126 great towns there were no deaths from enteric fever or scarlet fever, 1 (0) from measles, 11 (2) from whooping-cough, 11 (2) from diphtheria, 44 (7) from diarrhœa and enteritis under two years, and 1148 (128) from influenza. The figures in parentheses are those for London itself.

Manchester reported 3 deaths from whooping-cough. There were 10 fatal cases of diarrhœa at Birmingham.

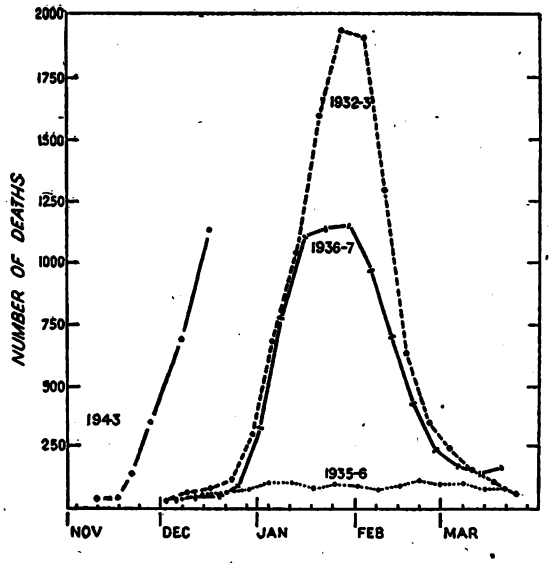
The number of stillbirths notified during the week was 199 (corresponding to a rate of 33 per thousand total births), including 23 in London.

Messrs. CIBA Ltd. have published a new edition of their handbook No. 2 in two parts, now called the *Nupercaine Handbook*. Part 1 gives full details of the use of 'Nupercaine' for spinal anæsthesia, including the technical errors which may lead to failure, and the reasons for postanæsthetic complications. Part 2 deals with surface, infiltration and regional anæsthesia and gives tables of dosage and some account of the chemistry, physics, pharmacology and toxicology of nupercaine. Copies will be sent to doctors on request.

Public Health

THE INFLUENZA EPIDEMIC

AFTER another week the epidemic retains its character of a widespread nuisance. The Ministry of Health has quoted some figures from abroad: 90,000 cases at Washington, 32,000 at Milan, half a million in Berlin. Some indication of its extent in this country has been given by official statements that one railwayman in ten has been off duty and that the call-up of pharmacists and dispensers has been postponed. Life has been very hard, especially in isolated homes, and the local colour in many hospitals and institutions has been sombre. But no alarm has been felt, and it may not be improper to apply to the nation in its transient illness the noble words of the *New York Times* last week about the Prime Minister: "We do not get the picture of a sick man, but of a man stoutly contending with an adversary." The week's toll of deaths has risen to 1148,



only 7 short of the 1936–37 peak; but the multiplier on the previous week has fallen to × 1·6, and the mortality has remained chiefly in the later decades of life, the London figures of age incidence being 1-0-1-0-1-2-4-9-22-41-47. Another week should see us near the peak, without approaching the level of 1932–33 (and remote indeed from the 7557 deaths for the week ended Nov. 9,

Weekly Deaths from Influenza in the Great Towns of England and Wales

Week ended	AGGR.	Lond.	Grtr Lond.	NORTH	MIDL.	Manc.	B'fd	B'hm	B'tol
Nov. 13	46	6	16	19	12	4	2	2	4
20	106	10	16	56	24	4	7	1	9
27	375	29	71	172	81	44	17	20	18
Dec. 4	709	72	181	288	157	47	11	57	16
11	1148	128	349	449	248	62	28	73	22

1918). That the drop will be as rapid as it was in 1933 is less certain, with the winter for the most part still before us. Judging by the R.G.'s return, the let-up in the Northern area continues, some further rise in London and the Home Counties is to be expected, and for the Midlands we may hope that the story of Birmingham, which follows, is nearly completed. We should of course not forget that by the time someone has succumbed to an attack his (say) 4000 more fortunate contemporaries are mostly back at work. Deaths, as the Ministry puts it, fall more slowly than cases; and as influenza is not notifiable we can only guess at cases.

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Local Colour: Birmingham

THE Medical Research Council, through its Industrial Health Research Board, will shortly be issuing a sickness-recording system for the use of industry as a whole. Unfortunately this will not be ready for use at the beginning of the new year. When it is generally adopted we shall, for the first time, have morbidity figures for the working population. Mortality-rates have so far been the only index of health. Epidemics emphasise the need for accurate and integrated sickness records. Thus some 6500 factories, shops and offices contribute to the Hospitals Contributory Association in Birmingham, and a questionnaire would have to be sent to each of these, and replied to, before the extent of the present influenza epidemic among the workpeople there could be judged.

An industrial medical officer who spends his whole time going about factories in the city thinks that so far influenza has only slightly interfered with production, and then mainly in the smaller firms where key men are off work. In his view the public, especially those who do not remember 1918, do not yet realise the potential significance of an influenza epidemic, though factory managements are now showing some concern at the possible stoppage of work. He has seen clear evidence of the influence of working conditions on absence rates; where factory hygiene is good and overcrowding minimal there is less risk of spread; in one factory where both personnel and plant are overcrowded 20–25% of the workers have been down with the flu.

Taking an average over the year, the sick-absence rates in Birmingham factories stand at around 2–4% for men and 5–6% for women. The rates at present show about a threefold increase, with absences of 12–15%. Some firms keep a weekly analysis of sickness-benefit claims, which shows the number of people off duty with each ailment, but not the time lost. In one such works, employing 5000 men and 5000 women, the sickness claims listed under influenza for the four weeks, Nov. 20, 27, Dec. 4, 11, were 22, 55, 72 and 49 for men, and 17, 53, 61 and 35 for women.

Among the remedies used in Birmingham factories are gargling, spraying of rooms, and the use of ultraviolet light, but very few seem to know anything of aerosols, oiling of floors and so on. The Ministry of Health mask, recommended so strongly two years ago, has not been taken up, mostly because workpeople hate to think they look foolish. The industrial medical officer already quoted maintains that the most important preventive measure as far as industry is concerned is the diminution of fatigue by reducing hours of work. The workman is naturally averse to reducing his hours and therefore his wages, and as a result men in the heavy industries in Birmingham are still working 65–80 hours a week. The maximum hours for women, 54 per week, are often being worked, in addition to home duties.

HOSPITAL EXPERIENCE

An EMS hospital admitting Service and civilian sick from the Birmingham area, as well as patients from the wards of the city hospitals, noted a sharp rise in admissions of acute respiratory infections beginning on Nov. 17. The influenzal cases admitted were mostly mild, the predominating symptoms being headache, backache, general aching of the limbs, coryza, often with long paroxysms of sneezing, moderate sore throat and slight cough. Temperatures from 100° to 103° F. The patients were flushed, with conjunctival injection, coated tongue, and injected pharynx. The lungs were either clear or exhibited a few scattered rhonchi. Symptoms and fever usually lasted 24–36 hours, and rarely more than 48 hours after taking to bed. The patients were allowed up when their temperature had been normal for 48 hours, and were mostly fit for discharge 10 days after admission. This hospital admitted 23 cases of bronchopneumonia and 1 of lobar pneumonia during November. All except one of these responded well to sulphamezathine; the one exception being probably a case of atypical pneumonia in which the temperature fell by lysis during the 6th to 8th day after admission. The only complication encountered was a pleural effusion in a woman of 22. Most of this hospital's cases were in young adults; there were no deaths.

Nurses have been badly hit by the epidemic. Up to the second week of December the numbers affected in Birmingham hospitals were roughly as follows:

Hospital	*Nurses*	*Affected*
General	206	50
Dudley Road	426	57
Queen Elizabeth	456	50
Selly Oak Hospital	250	45
Selly Oak Infirmary	380	63
Children's	110	10

These figures probably include some common colds. Among the 50 nurses affected at the Queen Elizabeth Hospital, rigors were recorded in 26 cases, pyrexia over 100° F. in 57, headache in 47, backache in 37, and cough in 37; the average duration of fever was 2–3 days, and the average stay in bed 4·7 days. Sinusitis developed in 2 of the nurses, and conjunctivitis, bronchiolitis, otitis media and tonsillitis each in 1. Pulse-rates often fell sharply before the fall of temperature, and 18 cases showed a bradycardia of 60 or below per minute.

The school medical officer reports that for November the attendances at the elementary schools were only 4% below the average. This confirms the experience at the Children's Hospital, where out of 54 admissions to the medical side in the three weeks up to Dec. 11 only 10 were labelled upper respiratory infection, compared with 9 out of 52 admissions for the same period of 1942. About half of the 10 admissions were probably for complications of influenza, though without a family history this would not have been detected. On the other hand, about half of the children in the hospital's day nurseries are said to be affected, and about a third of the nursery staff. At the Ear and Throat Hospital the number of children requiring paracentesis has doubled, compared with normal times; these cases have cleared up in outpatients without complications. There has also been a definite increase in acute suppurative otitis media in adults.

At the General Hospital, among 19 cases of influenzal pneumonia seen by one physician there have been 3 deaths. The women with pneumonia all told the same story—battling with a cold for some days to keep the home going, and a sudden chill while standing in a shopping queue. Two of the fatal cases—a young man and a middle-aged woman—showed heliotrope cyanosis; the third was in a woman near term with her fourth child. The pneumonia in these 19 cases was unaffected by sulphonamides; physical signs were slight but X-ray shadowing sometimes surprisingly dense. The onset was sudden, temperature often 104° F., headache severe, pleurisy rare, cough slight if no previous bronchitis, sputum scanty and only occasionally bloodstained. Defervescence was gradual.

At Selly Oak Infirmary, of 19 patients who died of influenza during November and the first week of December, there was one aged 11 weeks and others aged 2, 24, 28, 34 and 44 years; the rest were people well over 50, with previous lung damage, such as chronic bronchitis, fibrosis of lung or bronchiectasis, or with such conditions as diabetes. Autopsies showed the typical angry redness of the trachea and main bronchi, and haemorrhagic areas scattered over the lung fields. The heart muscle looked unhealthy in every case.

SHIP-BORNE SMALLPOX

A SHIP from North Africa arrived in a West Scottish port on Nov. 24 with a case of confluent smallpox on board, a soldier, aged 23. He had sickened on Nov. 15 and had been admitted to the ship's hospital next day, and was diagnosed smallpox on Nov. 19, thereafter being isolated in one of the cabins adjacent to the hospital. This cabin was entered from an alleyway, with access to it through the ship's hospital. The patient had been vaccinated, unsuccessfully, on Aug. 5, 1942, this being his first vaccination.

The ship had a crew of about 200 along with 148 other personnel, and carried a full complement of passengers—3500, including about 400 marine survivors comprising Dutch, Javanese and British, along with others. When the case occurred there was only sufficient lymph on board to vaccinate about 100 of the immediate contacts. On its arrival, the ship was detained at the

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anchorage, and arrangements made to inspect and vaccinate everyone on board. This procedure was completed on Nov. 24, the date of arrival of the ship. It was obvious, however, that vaccination at that stage would confer insufficient protection on any susceptible persons who might have been exposed to infection during the earlier period of the patient's illness. The ship was full to capacity.

These factors largely determined the subsequent measures that were taken, with the full consent and coöperation of the regional port director and other authorities concerned, the aim being to secure adequate surveillance for a period of 14 days after the removal of the patient from the ship to the smallpox hospital ashore. With this end in view, the following measures were adopted.

1. The ship was detained at its anchorage and not permitted to proceed to its original destination.

2. The passengers were disembarked on Nov. 26 after reinspection, appropriate instructions for surveillance, to end on Dec. 8, being issued by the authorities. A few who were on a different deck and unlikely to have come into contact with the patient were allowed home. Their addresses and the location of the station to which the passengers went were notified to the health authorities of the districts.

3. All others were kept on board, including (*a*) a group of 39 men whose previous vaccinations were judged to be unsatisfactory by the inspecting medical officers, (*b*) the 42 inmates of the ship's hospital, (*c*) the marine survivors, and (*d*) the ship's crew.

4. Finally, on Nov. 27 and 29, those in group (*b*) were removed to hospital ashore, while those in groups (*a*) and (*c*) were transferred to a station in the country, where they were detained under observation until Dec. 8—i.e., fourteen days after the case of smallpox was removed from the ship. The reason for clearing the ship of all except the crew was to enable the vessel to go to sea; none of the crew was allowed ashore before the ship sailed.

These precautions amounted to a frank imposition of quarantine. The salient facts ascertained when the ship arrived were that the patient was in his ninth day of illness, in the confluent stage of smallpox; vaccination of passengers and crew when the case was diagnosed on the ship had been possible only to a limited extent owing to lack of lymph; and the case had occurred under conditions of close contact which obtain on a crowded ship. Further, the general revaccination carried out when the ship arrived could not be regarded as an adequate precaution; consequently, the problem resolved itself into one of surveillance under circumstances which would allow of proper daily medical supervision, a view which was accepted and acted on by the authorities responsible for the movements of the ship and of the personnel on board.

These were the main reasons for the steps taken in this case, but the decision to adopt them rested also on previous experience last year. On May 29, 1942, a ship arrived in the Clyde, when a member of the crew was found to be suffering from confluent smallpox, diagnosed as measles, the rash appearing on or about May 24. As subsequent events revealed, the infection had already spread among the crew and to the passengers, both directly and indirectly, while general vaccination of those on board did not in fact prevent the outbreak which subsequently took place. During the course of this outbreak, instances occurred where contacts contracted smallpox, although successfully vaccinated during the early days of the incubation period of the disease.

Thus, the situation on the two ships was similar in that each had on arrival at the port a confluent case of smallpox on board, the patient being approximately at the same stage of the illness—the ninth day. In neither case had general vaccination been carried out on board until port was reached, because on the former ship the real nature of the illness was not recognised and on the present ship there was insufficient lymph. On the other hand, the isolation of the patient in the present case was much better, but the risk from crowding was greater.

As regards the subsequent story, none of those who were isolated ashore or in hospital has since contracted smallpox. It is not possible to give an accurate account of the previous vaccinal history of all on board. As explained, the vaccination state of certain passengers, 39 in all, was judged to be unsatisfactory by the medical officers conducting the inspections and they were taken to the special station ashore, along with the marine survivors and the others. Observations made at the station showed that a good response to vaccination was obtained as regards (*a*) 21 out of the above 39 with unsatisfactory previous records; (*b*) in 9 out of 38 others, and (*c*) in 13 out of the 121 Dutch survivors, apart from a considerable number in these groups in whom there was a modified reaction. These results indicate a degree of susceptibility among the contacts.

There is no precedent in recent times for the policy of quarantine adopted. The steps to be taken on the arrival of a ship at a port are embodied in the Port Sanitary Regulations, 1933, as agreed at the International Sanitary Convention of Paris in 1926, under which those on board are vaccinated and allowed to proceed to their shore destinations, surveillance there being the duty of the local health authority. This has been the invariable practice hitherto at all ports in this country. But the regulations themselves as drafted can be interpreted as giving wider discretionary powers to the port health authority. This incident again raises the question of protection by vaccination of those who travel from infected countries to home ports.

Obituary

HUMPHREY BARRON THOMSON

MB BELF; CAPTAIN RAMC

Captain Humphrey Thomson, who had been reported missing, is now officially recorded as killed in action during December, 1941. From the meagre accounts which have filtered through from the Far East it appears that the battalion of the regiment, to which he had been posted, was holding part of the border between Malaya and Thailand. The regimental aid-post established somewhere near Alor Star was attacked and wiped out by the Japanese in the early days of their invasion. The sergeant of the unit escaped and reported that Captain Thomson was killed in this assault.

Henri, Belfast

The only son of Prof. W. W. D. Thomson, FRCP, of Belfast, Humphrey Barron Thomson was born in 1916 and educated at Elm Park and Campbell College, Belfast. He qualified from Queen's University in 1939, and after six months in the Royal Victoria Hospital as house-physician to Dr. Boyd Campbell and as house-surgeon to Mr. Howard Stevenson, he joined the RAMC. Shortly afterwards he volunteered for service in the Far East and before he left he married Miss Mary Glendinning, of Island Reagh, Comber, co. Down. On arrival in Malaya he acted as medical officer in the military hospital at Singapore till he was posted as a regimental medical officer.

Humphrey Thomson was full of the joy of life. His wit and humour, his high ideals, and his outspoken championship of what he considered right won the regard and affection of his contemporaries, while his kindness of heart and old-world courtesy endeared him to the older generation. He would have been the last to claim any brilliance of scholarship or profound book knowledge but in the medical profession he found an ideal niche for his capabilities and shrewd common sense. His success was also due to the absorbing interest he took in his patients whom he regarded as men and women rather than as cases, for subconsciously he obeyed the Hippocratic maxim—To a love of his profession the physician should add a love of humanity.

DR. BURTON WOOD

N. L. R. writes: It was my good fortune in recent years to be closely associated with Dr. Burton Wood in his work at the London Chest Hospital. His loss to the hospital and to his colleagues is very great. He gave

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generously of his knowledge and experience of respiratory medicine and the lessons learned from his method of approach to clinical problems are abiding. He never relied overmuch on the stethoscope, but was able to get more accurate information from a skiagram than most men, while his power of description and choice of words enabled him to impart his findings to others. He was not, however, exclusively, or even predominantly, "radiologically-minded": he was a shrewd clinician in the broadest sense, giving due weight to the history and frequently using with advantage for diagnosis and prognosis the physical characteristics and mental reactions of a patient. Fine physician and brilliant speaker though he was, it was in an armchair round the fireside that Burton Wood excelled. In this intimate atmosphere he delighted to discuss a wide range of subjects and his guest would always leave wiser than he came.

Notes and News

RED SQUILL FOR RATS

Blue squill charms the eye with its inflorescence, its white bulb comforts the bronchitic, and the red variety demolishes rats; so that man has reason to cherish and admire the little lily. Among rat poisons red squill stands high; Dr. Morgan's total war on rats, described in this column last week, commended its use, "if you can get it." Of late none has been available from Sicily or Malta. Arsenic and zinc phosphide are plentiful, and are good poisons if properly used, but some think that results could be achieved more quickly with strychnine—a painful and undesirable poison not at present permitted. Rats have been breeding fast in the dock areas, and the Pharmaceutical Society have been considering whether they should ask Mr. Herbert Morrison to release strychnine for killing them. Fortunately this should not be necessary. A cargo of red squill has arrived from North Africa and another is expected. Defestation of the dock areas and warehouses will be hastened by this well-timed argosy.

University of Cambridge

On Dec. 11 the degrees of MB, B CHIR were conferred on J. R. Handforth by proxy. At recent examinations the following were successful:

Part I: surgery, midwifery and gynæcology.—M. S. Adams, C. G. Attenborough, H. H. E. Batten, T. S. L. Beswick, P. L. Blaxter, K. A. C. Bowen, D. Brazier, D. W. Burnford, J. D. Burton, I. J. Carré, I. R. Clout, A. Comfort, R. P. Cook, P. J. Coope, P. B. S. Cooper, P. D. B. Davies, C. D. Drew, E. D. Dyson, R. D. Eagland, D. A. W. Edwards, F. H. Epstein, D. M. Evans, M. Farquharson, J. J. Fleminger, M. A. Floyer, P. H. Friedlander, J. W. Fullerton, S. A. M. Garibian, H. M. Giles, M. T. Gillies, M. L. Graeme, C. R. H. Green, J. A. Harrington, C. E. Hartley, G. Hartridge, F. N. Hicks, I. S. Hodgson-Jones, C. B. Holmes, N. S. Hooton, R. C. A. Hunter, G. I. C. Ingram, R. E. Irvine, D. G. James, M. C. Joseph, E. M. Kingsley-Pillers, A. G. Leatham, J. Lorber, P. F. Lucas, D. W. R. Lyle, M. B. McIlroy, I. L. McKelvie, R. M. MacPhail, I. A. Magnus, S. M. Martin, M. B. Matthews, P. D. Mort, M. W. L. Mutch, K. N. V. Palmer, T. J. S. Patterson, J. C. R. Payne, P. B. Philip-Smith, K. L. Prendergast, P. D. G. Pugh, K. E. E. Read, M. K. E. Reaney, T. J. Rendle-Short, J. Roche, L. J. Rowley, R. C. Roxburgh, F. A. R. St. John, B. Schofield, F. D. Schofield, H. F. Sebag-Montefiore, J. A. Shiers, J. F. N. Sidebotham, K. W. Symons, M. Symons, W. E. W. Tileke, J. H. M. Tilley, M. M. Tunstall-Behrens, R. G. Turner, J. Upsdell, D. R. D. Vanstone, D. G. Veater, N. T. Welford, D. P. Wheatley, B. J. Whitfield, A. P. Wingate, R. A. Womersley, K. A. A. Wray, G. S. Yeoh.

The board of research studies has approved Dr. Dorothy Russell for the title of the degree of D Sc.

Medical Awards

The following awards have been made in recognition of gallant and distinguished services in Burma and on the eastern frontier of India.

CBE.—Colonel Bijitendra Basu, OBE, IMS.

OBE.—Lieut.-Colonel C. F. J. Cropper, BA OXFD, MRCPE, IAMC; Colonel Charu Chandra Kapila, MRCP, IAMC; Colonel J. A. Mathison, MB, RAMC; Colonel Manfred Morris, MD MANC., RAMC; Lieut.-Colonel Victor Perez, MD LOND., RAMC.

MBE.—Major G. D. W. Adamson, LRCPE, RAMC, Asst. Surgeon (British cadre) A. V. Barker, IMD; Captain J. B. Hurll, MB GLASG., RAMC; Major J. S. Kerss, MB EDIN., RAMC; Captain J. G. Scott, MB DURH., RAMC; Subadar V. D. Sharma, IAMC; Major J. F. Shepherd, FRCS, IAMC; Subadar C. Singh, IAMC; Major L. S. F. Woodhead, MRCS, IAMC.

DSO.—Lieut.-Colonel G. R. Marshall, MRCS, RAMC.

MC.—Captain N. P. Mahapatra, MB., IAMC.

By permission of the Privy Council the name of the Chartered Society of Massage and Medical Gymnastics has now been changed to The Chartered Society of Physiotherapy.

University of Manchester

At recent examinations the following were successful:

O. E. Adeniyi-Jones, J. R. Archibald, Margaret A. Barber, Kathleen M. Brown, Alice I. Burke, Margaret A. Burke, J. L. Clarkson, Hyman Davies, I. L. Gregory, E. J. Guest, Jack Hinchliffe, C. L. Holden, Edmund Isherwood, G. W. H. James, F. W. Johnson, Friedrich Kratter, R. McK. Laslett, Alan. Marsland, T. M. Martin, Thomas Moss, J. F. O'Grady, Arthur Ramsden, F. C. Reidy, M. M. Rose, James Sharp (with distinction in surgery and medicine), and Elizabeth Travers.

King Edward's Hospital Fund for London

The Duke of Gloucester speaking from the chair at a meeting of the Fund on Dec. 14 announced that £280,000 was again being distributed among the voluntary hospitals. A special grant of £5000 had been made to St. Thomas's to help with expenses at its country branch at Godalming which were indirectly due to the war damage to the main hospital, and £4000 to Charing Cross as a first instalment towards its rebuilding on a site which has yet to be determined. This year £5000 had once more been set aside to encourage the establishment of group preliminary training schools for nurses. Not long ago only 20 of the 85 training hospitals in the fund's area had schools; soon there would be scarcely a dozen without one. Referring to the fund's report on hospital diet the Duke announced that several hospitals had already sought their advice and he was therefore appointing a committee with Prof. J. C. Drummond, D SC., scientific adviser to the Ministry of Food, as chairman. Sir Wilson Jameson would also be a member and Miss Margaret Broatch had been appointed dietetic adviser.

Appointments

MILLS, HERMIA, MB LOND.: MO at Holloway Prison.

READ, J. C., MRCS, LDS: medical registrar at the Royal Dental Hospital, London.

SOUTHWELL, NEVILLE, MB CAMB, MRCP: medical tutor and acting medical registrar at Guy's Hospital, London.

Births, Marriages and Deaths

BIRTHS

BICKFORD.—On Dec. 15, at Bolney, Sussex, the wife of Squadron-Leader B. J. Bickford, FRCS—a son.

JOHNSON.—On Dec. 15, in London, the wife of Lieut.-Colonel A. G. Johnson, RAMC—a daughter.

MOLE.—On Dec. 6, at Crediton, the wife of Captain R. H. B. Mole, RAMC—a daughter.

NEILL.—On Dec. 7, at Oxford, to Dr. Joyce Neill (formerly Gibbon Davies) wife of Mr. Desmond Neill—a daughter.

NICHOLL.—On Dec. 4, at Lewes, the wife of Surgeon Lieutenant Geoffrey Nicholl, RNVR—a son.

RAINEY.—On Dec. 15, at Harleston, Norfolk, the wife of Surgeon Lieutenant R. E. Rainey, RNVR—twin daughters.

RATCLIFFE.—On Dec. 14, at Derby, the wife of Mr. James R. Ratcliffe, FRCS—a daughter.

STEVENS.—On Dec. 7, in London, the wife of Major C. P. Stevens, RAMC—a daughter.

SYMONS.—On Dec. 13, at Moretonhampstead, the wife of Major H. M. SYMONS, RAMC, of Ballarat, Australia—a son.

MARRIAGES

HERFORD—CRAGO.—On Dec. 15, at Clifton, Bristol, Martin Herford, MBE, MC, MB, major RAMC, to Mary Crago, MB.

MCBRYDE—DAVY.—On Dec. 18, at Hale, J. R. McBryde, captain The Border Regiment, to Elisabeth Joan Davy, lieutenant RAMC.

OSTROWSKI—WIGHTMAN.—On Dec. 16, in Edinburgh, Tadeusz Maria Ostrowski, MB. CH B, 2nd lieutenant Polish Parachute Unit, to Helen Mary Wightman.

PICKERING PICK—NETTELFIELD.—On Dec. 11, at Pyrford, Michael Pickering Pick, MRCS, surgeon lieutenant RNVR, to Anne Nettelfield.

DEATHS

DUFFIELD.—On Dec. 17, at Bournemouth, Ernest Alphonse Duffield MRCS.

JOLY.—On Dec. 14, in London, John Swift Joly, MD DUBL., FRCS, aged 66.

TROUTON.—On Dec. 16, at Rotherfield, Sussex, Gardiner William Trouton, TD, MD DUBL., aged 85.

WILLIAMS.—On Dec. 15, John Robert Williams, MB EDIN., of Penmaenmawr, aged 81.

WILLIAMS.—On Dec. 14, at Midhurst, Sussex, Reginald Munro Williams, MD LOND., JP, aged 83.

WILSON.—On Dec. 12, Roger Parker Wilson, CIE, FRCS, DPH, lieut.-colonel IMS. retd.

** The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.*

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REFERENCES AND ABBREVIATIONS

Institutions and Corporations with the right to the prefix Royal will be found under that prefix, with the exception of Medical Societies, which are separately indexed under Societies. All Universities are indexed under the word Universities. (A) = Annotation, (C) = Correspondence, (LA) = Leading Article, (ML) = Medicine and the Law, (NI) = New Invention, (NP) = New Preparation, (O) = Obituary, (P) = Parliament and (R) = Review.

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